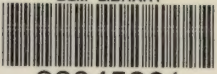


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FINAL ENVIRONMENTAL STATEMENT

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AGRICULTURAL DEVELOPMENT FOR SOUTHWEST IDAHO

BUREAU OF LAND MANAGEMENT
RAWLINS DISTRICT



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BOISE DISTRICT OFFICE

**FINAL
ENVIRONMENTAL STATEMENT**

**SOUTHWEST IDAHO
AGRICULTURAL DEVELOPMENT**

**PREPARED BY
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BOISE DISTRICT OFFICE**

Ed Hartley

DIRECTOR

PREFACE

This environmental statement (ES) concerns agricultural expansion in southwestern Idaho on a portion of the public lands administered by the Boise District, Bureau of Land Management. The document focuses principally on irrigation by direct high-lift pumping along the Snake River from where Salmon Falls Creek enters in the Hagerman Valley downstream to the Oregon border. It also addresses the opportunity for some deep well development between Bruneau and Murphy. Much of the public land in the study area is presently applied for under the Desert Land and Carey Acts, and high-lift pumping is the primary water conveyance system for these applications.

There are a number of other types of irrigation schemes that have recently developed that might differ or conflict with the high-lift pumping discussed in this ES. These are off-site water storage proposals such as the Little Pilgrim Desert Entry Project and the Bruneau Plateau Water Development Project (to be studied by Idaho Department of Water Resources over the next two years). Due to the number of comments received on the Draft ES concerning off-stream storage, there is a general description of that irrigation concept in Appendix 8-2. There is also the Salmon Falls Division Project which would pump groundwater near Idaho Falls in the Upper Snake River Valley and transfer it downstream to irrigate lands south of Twin Falls (Bureau of Reclamation proposal).

This ES is not associated with or a part of these proposals or any other type of aquifer recharge or water storage project. The purpose of this ES is to investigate impacts associated with high-lift pumping during the normal irrigation season.

SUMMARY

Draft Final Environmental Statement

Department of the Interior
Bureau of Land Management

1. Type of Action: Administrative Legislative

2. Brief Description of Action: The Bureau of Land Management would allow 111,015 acres of public land in Elmore, Owyhee and Twin Falls Counties to be developed for farming under the Desert Land Act (DLA) and Carey Act (CA). In addition, about 37,000 acres of public land adjacent to farm locations would be reserved for public purposes such as wildlife habitat tracts, gravel sites, air strips, sanitary landfills, etc. This development would occur from 1980 through 1984 at about 22,000 acres per year.

3. Summary of Environmental Impacts: Farm development under the proposed action will require 250,004 acre-feet of water from the Snake River, reducing flow by about 975 CFS in July, and about 27,823 acre-feet of groundwater between Bruneau and Murphy.

Idaho Power Company (IPC) would have to provide from 208 to 270 average megawatts (MW) of electricity during the peak irrigation month. This block of electricity would require additional IPC generating facilities and raise electricity rates for all customer classes.

Wind soil erosion losses would range from 15 tons per acre.

Up to 130,000 acres of native wildlife habitat would be eliminated including habitat of sensitive wildlife species (long-billed curlew, ferruginous hawk and burrowing owl). Upland game bird species numbers would increase dramatically. Game fish stocks in the Snake River would be reduced 5-25 percent.

Hunting for upland game birds would be enhanced while 60,400 acres of Off Road Vehicle areas would be lost.

There would be a loss of 14,975 AUMs-41,397 AUMs among 127 livestock operators on public land that would be converted to farms.

4. Alternatives Considered: (1) a total of 176,310 acres of farm development under DLA and CA; (2) a total of 28,590 acres of farm development under DLA and CA; (3) allow no development, reject all existing DLA and CA applications and impose a moratorium on further filings; (4) Federal Land Policy and Management Act of 1976 (FLPMA) Lease farm development; (5) FLPMA Sale farm development; (6) FLPMA Exchange farm development.

5. Comments Have Been Requested From The Following: Attached is a list of Federal, state and non-governmental agencies with jurisdiction and

expertise which would receive copies of the FES.

6. Date Statement Made Available to EPA and the Public

Draft: May 11, 1979

Final:

COORDINATION IN REVIEW OF THE DRAFT ES

Comments on the draft environmental statement were requested from the following agencies, interest groups, and individuals: (*Supplied Comments)

Federal Agencies

Department of the Interior

Bonneville Power Administration*

Bureau of Reclamation*

Fish and Wildlife Service*

Geological Survey*

Heritage Conservation and Recreation Service*

National Park Service*

Department of Agriculture

Agricultural Research Service

Agricultural Stabilization & Conservation Service

Forest Service*

Soil Conservation Service*

Farmers Home Administration*

Army Corps of Engineers*

Department of Health, Education and Welfare*

National Weather Service

Pacific Northwest River Basin Commission

State Agencies

Governor's Office

State Clearinghouse*

Agricultural Experiment Station, Moscow

Department of Agriculture

Department of Finance

Department of Health and Welfare

Department of Lands*

Department of Tourism and Development

Department of Water Resources*

Department of Fish and Game*

Highway Department

Idaho Energy Office

Idaho Public Utilities Commission

Soil Conservation Commission and Districts

State Planning Bureau

Oregon State Clearinghouse

Oregon Department of Natural Resources
Oregon State Water Resources Dept.

Washington State Clearinghouse
Washington State Fish Commission
Washington State Water Resources Dept.

Local Government

County Commissioners - Ada, Owyhee, Gooding, Elmore, Canyon and Twin Falls Counties
Planning and Zoning Commissions - Ada, Owyhee, Gooding, Elmore, Canyon, and Twin Falls Counties
County Agents - Ada, Owyhee, Gooding, Elmore, Twin Falls
Mayors - Boise, Mountain Home, Glenns Ferry, Bliss, Hagerman, Homedale, Twin Falls, Buhl
Highway Districts - Ada, Owyhee, Gooding, Elmore, and Twin Falls Counties

Other

Idaho Congressional Delegation
Idaho National Guard
Mountain Home Air Force Base

Economic Interests

All DLA Groups within the ES area*
Carey Act Association*
Grazing Associations in ES area
 Owyhee Cattlemens Association*
 Hagerman Grazing Association
 Southside Grazing Association
 71 Grazing Association
 Chipmunk Grazing Association
Idaho Cattlemen's Association*
Idaho Farm Bureau Federation
Idaho Mining Association
Idaho Power Company*
Idaho Water Users Association
Idaho Woolgrowers Association*
Pacific Gas and Electric
Southwest Idaho Development Association*

Non-Economic Interests

Ada County Fish and Game League
Audubon Society*
Boise Valley Fly Fishermen
Capitol Conservation Club
Coalition to Save the Snake
Desert Raiders Motorcycle Club

Ducks Unlimited
Elmore Motorcycle Association
Friends of the Earth
Gem State 4 x 4 Club
Gooding County Motorcycle Association
Greater Snake River Land Use Congress
Greyson Andrist, MRVC
Idaho Archaeological Society
Idaho Association of Soil Conservation Districts
Idaho Conservation League*
Idaho Environmental Council
Idaho Gem Club
Idaho Mining Association
Idaho Outdoor Association
Idaho Trails Council, Inc.
Idaho Trail Machine Association
Idaho Wildlife Federation*
Kent Lamberson, Director, WETA
League of Women Voters*
Mountain Home Air Force Base Sportsmen Club
Nampa Rod and Gun Club
National Wildlife Federation*
Nature Conservancy
National Resource Defense Council, Inc.
Northwest Agricultural Policy Project
Off-Road Motorcyclists Council
Outdoors Unlimited
Owyhee Motorcycle Club
Regional Studies Center
Sierra Club
State Historical Preservation Office
Wildlife Society

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REFERENCES

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION

Chapter 1 provides a brief background leading to formulation of the proposed action and preparation of this ES. The proposed action is discussed in terms of purpose, location, time frame, stages of implementation, required authorizing actions, its relationship to other land use projects and planning.

CHAPTER 1

DESCRIPTION OF THE PROPOSED ACTION

HISTORY AND BACKGROUND

Agriculture has long been the most important component of Idaho's economy. Much of Idaho's farmland was once public land and was developed under the Desert Land Act (DLA) and Carey Act (CA). Over 1.5 million acres have been patented under the DLA and about 600,000 acres via the CA since their enactments in the late 1800s. Today, the Snake River Plains area in southwest Idaho has one of the largest blocks of public land left in the nation with potential for new farm expansion. State-wide, there are over 1,400 DLA and 90 CA applications pending on about 700,000 acres of public land administered by the Bureau of Land Management (BLM). The highest concentration of these applications is on Boise District BLM administered land in southwestern Idaho.

Most prime agricultural land near sources of irrigation water in Idaho were developed by the turn of the century. In the late 1940s, the first deep well for irrigation on the Snake River Plain was drilled near Rupert, Idaho. This opened a new possibility for land conversion under the DLA, and a flurry of development followed. In the early 1960s, another breakthrough occurred when the first high-lift pumps were used to elevate water hundreds of feet from the Snake River onto benchlands south of Nampa in the Dry Lake farm area. As a result of these irrigation methods, 1,440 desert land entries totaling 317,645 acres were converted from public to private ownership from 1947 to 1973.

High farm commodity prices between 1970 and 1974 created a favorable climate for new farm development. Intense public interest was evidenced by the increased number of DLA and CA applications filed during the early 1970s.

The Bureau developed two land use plans for portions of the area, one in 1972 and the other in 1975. However, these planning documents did not provide adequate guidance for allocating public land to new farm development. As a result, an environmental analysis report (EAR) was written covering overall agricultural expansion on BLM administered land in southern Idaho. This document, published in January of 1976, depicted possible environmental impacts agricultural development could have on the region. It also identified high and low resource conflict areas.

In 1977, the BLM Director authorized the State BLM Director of Idaho to prepare this environmental statement (ES) in accordance with the National Environmental Policy Act (NEPA). As authorized, it focuses on about 440,000 acres of public land in the Boise District and is keyed to Part Two of the Idaho State Water Plan, published in March 1976. The State Water Plan was geared in part to implement the objective of increasing Idaho's agricultural production to "maintain the state's current share of the national and international market." It projected

irrigating an additional 790,000 acres of potential agricultural land in southern Idaho by 2020. The proposed level of farm expansion in this ES, 111,015 acres from 1980 through 1984, was derived from this projection.

PROPOSED ACTION

The proposed action to be analyzed in this environmental statement is to allow conversion of 111,015 acres of public land within the BLM Boise District to irrigated farmland during the period 1980 through 1984. Such conversion would occur by the DLA and CA. This development would take place principally on Class 1 and 2 soils, which are the best soils having high crop production potential. Irrigation water would be provided primarily by high-lift pumping from the Snake River and, to a lesser extent, by groundwater pumping. In addition to raising crops on this land, a small portion of the 111,015 acres, about 3 percent, would be devoted to on-farm access roads, shop buildings, equipment storage areas, residences, etc. The proposed action is not to be construed necessarily as the BLM's position, but rather a logical course of action to be taken if agriculture expansion in the ES area took place.

The proposed action would take place in Elmore, Owyhee, and Twin Falls counties. Table 1-1 illustrates current cropland acreages and new farmland acreage to be developed under the proposed action.

TABLE 1-1
ACRES OF CROPLAND IN AFFECTED COUNTIES -
CURRENT AND UNDER PROPOSED ACTION

County	Total County *	Cropland Dry **	Cropland Irrigated Surface **	Cropland Irrigated Sprinkler **	Total Cropland
Owyhee	4,888,960	-	150,455	22,400 (46,800) <u>1/</u>	172,855
Elmore	1,953,280	28,210	35,276	62,900 (51,115) <u>1/</u>	126,386
Twin Falls	1,242,886	6,000	263,160	19,600 (13,100) <u>1/</u>	288,760
Totals	8,085,120	34,210	448,891	104,900 (111,015) <u>1/</u>	588,801

* BLM Facts In Idaho

** Idaho Almanac 1977, Idaho Division of Tourism and Industrial Development, Boise, Idaho

1/ Acreages to be farmed under the proposed action

Besides developing 111,015 acres of new farm project areas, 25 percent of the developed area, or an additional 37,000 acres of intermingled tracts of federal land, would be reserved for public purpose needs associated with agricultural land uses. Public access to these tracts would be reserved.

About 18,000 acres of these tracts would be devoted to wildlife habitat enhancement. As such, each wildlife tract would be fenced for identification and protection. Water catchments would be developed at strategic locations for wildlife. Where the existing vegetation is not optimum, dryland shrubs, forbs, and grasses would be established. Selection criteria for these wildlife tracts are discussed in Appendix 1-1. Other tracts would be reserved for sanitary landfills, airstrips, sand and gravel deposits, archaeological sites, endangered plant species and future building spots for public facilities such as county maintenance yards. Thus, 148,000 acres of public land would be directly affected under the proposed action.

A large block of electricity would be required to provide energy for irrigation pumping on new farms under the proposed action. It is estimated that approximately 207 average megawatts (MW) would be required in the peak irrigation month during a normal climate year and 270 average MW during a drought year such as occurred in 1977. (These estimates include both the direct demand for pumping water to the new farms, plus hydroelectric losses at dams downstream from irrigation diversions for the proposed action, see Chapter 3 Energy). Current company-owned generating facilities could not meet this new load demand. Because of the uncertainty at this time of where the electricity would come from and how it would be generated, no attempt is made to analyze site specific environmental impacts associated with any power plant generating facilities. This ES will, however, attempt to analyze the economic impact on the affected users of electricity under some possible scenarios of future electricity supply sources.

Land Transfer Methods

The public land involved in this ES could be transferred to private ownership under either of the following two statutes:

Desert Land Act (DLA)

This act was passed in 1877 and has been amended a number of times. It allows a state resident to file on up to 320 acres. DLA applications are filed singly or in group project proposals similar to the CA. There is an initial filing fee of \$.25 per acre plus \$1 per acre prior to obtaining patent. There must be an investment of at least \$1 per acre each year for three years covering costs of land preparation and construction of irrigation works. Patent applications, subject to time extension for certain cases, are to be filed within four years after entry is allowed, and water must be available to all irrigable portions of the entry. At least one-eighth of the entry is to be cultivated at the time of patent application. The DLA does not require an entryman to

build a home on the farm unit. The BLM has administrative control of the land under a DLA filing until patent is issued.

An individual can independently develop a farm with one irrigation system that serves only his single entry or he can join a group of individuals that cost share a larger irrigation system with a river pump station. As of January 1, 1979, there were 230 single and 16 group DLA projects incorporating 301 member applications in the ES area. Maps 1-1 and 1-2 are location maps depicting the ES area and Map 1-3 illustrates public land in the ES area that was under DLA and CA application on January 1, 1979.

After DLA applications are filed in the BLM Land Office in Boise, they are adjudicated and forwarded to the respective BLM District Office where the land is located. The District Office has the responsibility of collecting and compiling information used to classify the land as suitable or unsuitable for farm development. Economic, engineering, and environmental feasibility is evaluated in an Environmental Analysis (EA) and Land Report document. In addition to the farm proposal itself, any associated "off-farm" projects (canals, ditches, pump stations, power lines) are analyzed. The EA and Land Report also identifies measures that can be taken to reduce negative environmental impacts.

Once the BLM reaches a decision, initial and final classification notices are issued. These are public notices of the BLM's decision to approve or reject the application. Any interested party may submit protest to the decision, and BLM must address the protest with a written analysis. If and when the land is classified as suitable, a notice of allowance is issued to the applicant. The applicant is then free to commence development of the land.

Carey Act (CA)

The Carey Act (CA) was passed in 1894, and was intended, like the Desert Land Act, to aid in the reclamation of desert lands. Unlike the Desert Land Act, it requires settlement on the lands, and the State, rather than a private person or the Federal government, is responsible for causing the lands to be reclaimed and for inducing settlement and cultivation. In furtherance of these objectives, the Act authorizes the Secretary of the Interior, with the approval of the President, to enter into contracts with States granting them such desert land, not exceeding 1 million acres in each State, as the State may cause to be irrigated, reclaimed, occupied, and cultivated by actual settlers. Amendments to the Act in 1908 increased to three million acres the amount of land available to the State of Idaho under the Act.

Since 1975, there has been litigation pending on interpretation of the Carey Act. The State of Idaho has contended that the Carey Act granted the State 3 million acres of land, subject to the requirements of reclamation by the State and settlement and cultivation by actual settlers. The United States has contended that the Carey Act merely gave the Secretary and the President discretion to enter into contracts with the State granting desert lands for the purpose of reclamation,

settlement, and cultivation. On April 19, 1979, the United States Court of Appeals for the Ninth Circuit affirmed the opinion of the United States District Court for the District of Idaho. The District court had held that (1) the Carey Act made a conditional grant of 3 million acres of desert lands to Idaho, but withdrawals of public lands made before the State submitted a grant application were valid to prevent selection, and the only way for the State to obtain such lands would be to petition the Secretary for classification or reclassification for Carey Act entry pursuant to section 7 of the Taylor Grazing Act or to petition for revocation or modification of the withdrawal; and (2) two persons occupying the same residence could satisfy the settlement requirements of the Act and each obtain 160 acres if their residence were built on the dividing line between the two parcels. The United States has appealed to the Supreme Court. On October 15, 1979, the Court agreed to hear the case.

Carey Act projects are organized and proposed by the State. They normally incorporate a large number of entrymen into the development to share the project costs. The State is responsible for causing the lands to be reclaimed through the development of irrigation works, and for inducing the settlement and cultivation of the lands in 160-acre units. Application fees and project costs to be charged to individual settlers are determined by the State.

Proposed Interior Carey Act regulations were published in the Federal Register of April 5, 1977, at pages 18100-18102. Final regulations are still under review. The regulations as proposed provide that the State will submit an application to BLM containing a project proposal, and BLM will proceed to decide whether to approve or reject the application pursuant to the same classification procedures under which Desert Land act applications are approved or rejected. During this process, BLM assesses economic and engineering feasibility and environmental impacts. If the lands are classified as open to Carey Act entry and the project plan is approved, a contract is then signed between the Secretary of the Interior and the State, subject to the approval of the President. When the Secretary signs the contract the land is segregated, and the State must begin construction of the reclamation works within a maximum of 6 years and must cause the lands to be reclaimed and irrigated within a maximum of 15 years. When reclamation has been achieved and the terms of the contract fulfilled, patents are issued either to the State or directly to the settlers involved.

Since the Carey Act was passed, approximately 600,000 acres of lands have been patented to settlers in Idaho. Most of these projects were developed between 1895 and 1914, with the last acreage patented in the 1930s. At present there are 16 State applications pending with BLM for public lands within the area covered by this environmental statement. (See Map 1-3). BLM has suspended action on the applications pending the outcome of the Carey Act litigation described above and the completion of compliance with the National Environmental Policy Act.

Project Purpose and Objectives

The purpose of the proposed action is to allow conversion of undeveloped public land into farmland under the DLA and CA. New farms would produce agricultural products for human consumption and feed for livestock, and help maintain Idaho's agricultural base.

As of January 1, 1979, there are 531 DLA and 16 CA project applications covering an estimated public land area of about 270,000 acres within the ES area (see Map 1-3). Some of these applications have been on file since the mid 1960s, and in many localities much of the acreage has been applied for by more than one applicant. Map 1-3 depicts those areas where there are overlapping DLA and CA applications. There are about 56,000 acres where CA projects have been filed over DLA filings, and approximately 8,000 acres of DLA filings over other DLA applications. This has resulted in a conflicting and complicated arrangement of applications in the ES area.

The primary objective of this ES is to identify and analyze environmental and social impacts arising from agricultural development of certain public land within the BLM Boise District. It will identify what impacts would result if a certain level of development took place at certain likely locations. This is not a "site specific" analysis, but rather a broader illustration of impacts expected from new farm expansion. It is expected that the information contained in this ES can be applied to other BLM administered land in southern Idaho where agricultural expansion is a possibility.

Ultimately, this ES will provide decision-makers with information needed to respond to a large backlog of CA and DLA filings. Specifically, this ES will help decision-makers answer the following questions: 1) is agricultural development of public land in Idaho in the national interest as required by Title I, Sec. 102(1) of the Federal Land Policy and Management Act (Public Law 94-579); 2) if such development is in the national interest, where and at what rate should it occur; and 3) what authority would provide the best method(s) for authorizing agricultural development of public land?

Location

Map 1-2 illustrates the ES area. It is totally within BLM's Boise District in southwestern Idaho. The ES encompasses portions of Owyhee, Elmore, and Twin Falls Counties and four BLM planning units - Owyhee, Bruneau, Bennett Mountain, and Saylor Creek (see Map 1-2). The ES area is about 125 miles long and 45 miles at the widest point. It includes 440,000 acres of public land managed by the BLM. Table 1-2 depicts land status (ownership) in the counties affected by this ES.

TABLE I-2
COUNTY LAND STATUS STATISTICS

County	Total Land In County (Acs) *	Total Public Land In County (Acs) *	% Public Land In County *	Total County Land In ES Area (Acs)	Private Land In ES Area (Acs)	State Land In ES Area (Acs)	Public Land In ES Area (Acs)	Farm Development Land In Proposed Action (Acs)
Owyhee	4,888,960	3,657,601	75	323,159	108,254	9,961	204,944	46,800
Elmore	1,953,280	543,788	28	246,680	60,037	7,043	179,600	51,115
Twin Falls	1,242,886	552,074	44	108,899	52,860	1,280	54,759	13,100
TOTALS	8,085,120	4,753,463		678,738	221,151	18,284	439,303	111,015

* Taken from the publication-BLM Facts in Idaho, 1977

Communities within the ES region are small, varying from Murphy, population 75, to Glens Ferry, population 1,386. Boise (state capitol) and Mountain Home to the north and Twin Falls to the east comprise the larger towns adjacent to the ES location.

Overlay 1A and 1B (found inside the back cover of this document) identify public land tracts where new irrigated cropland could be developed under the proposed action. Although the better soil locations are depicted on Overlay 1A and 1B, it should be pointed out that there are also lesser amounts of intermingled poorer quality soils (Class III and VI) within the proposed action areas. All public land in the ES area that is available for DLA and CA development was divided into 40 acre parcels. Where a parcel had more than 50 percent (20 acres) Class I and II soils, the entire 40 acres was considered suitable for agricultural development under the proposed action. Forty acre parcels were likewise considered non-suitable where there was less than 50 percent Class I and II soils. The proposed action is therefore a theoretical configuration of farmland development. Overlay 1A and 1B indicates a total of 148,020 acres suitable for farming under the previously described selection criteria.

In reality, when a farm is designed and the irrigation systems laid out, there may be some inclusion of poorer grade soils within the farm unit. It is typically more profitable to include isolated locations of poorer soils than to farm around them. Nonetheless, if agricultural development is eventually allowed in the ES area, farm unit layout will have to be concentrated on the better soils to assure a profitable return to the farmer. Economic feasibility of a particular farm unit is directly dependent upon soil productivity.

Time Frame

Development of 111,015 acres of new farms under the proposed action would take place over a five-year period, from 1980 through 1984, at an average of about 22,000 acres per year. Development at this pace could be done on an orderly basis throughout the five-year period. It would provide time for various federal, state, and local planning on a site specific basis. It would also permit development impacts to be dispersed over a long period, reducing the impacts which could result from immediately "flooding the market" with 111,015 acres of new farmland.

Construction of farm facilities and irrigation systems would lag behind BLM approval to enter upon the land by as much as four years or more. With 22,000 acres allowed in 1984, for example, it could be 1988 before some DLA farms were fully operational and harvesting crops. The time span used to establish a farm unit could be a function of the law by which the public land was transferred to the entryman. For instance, under the DLA, the entryman is given a four-year development period plus grants of time extensions for unavoidable delay in the construction of irrigation works.

Under CA after the land has been classified, the entryman has six years to commence with construction of the irrigation works. The entry must be irrigated and reclaimed within a maximum of 15 years. Therefore, under CA it could be 1999 before some farms were in private ownership.

STAGES OF IMPLEMENTATION AND DISCRETE OPERATIONS

After BLM and other agencies have approved a specific project, the entryman can commence with land preparation and irrigation system construction.

The following section describes the development stages that would take place in constructing new farms in the ES area. It is of a general nature because construction methods and types of irrigation facilities used in new farm expansion vary. It is patterned after existing agricultural land in the ES area. Water would be applied by sprinkler irrigation systems, and all pumping power would be supplied by electricity. Potatoes, winter wheat, barley, sugar beets, dry beans, and alfalfa would be the crops grown.

The project description of the proposed Indian Hills CA project, located on the south side of the Snake River near Hammett, is an example of a typical project. The description, found in the Appendix 1-2, typifies the engineering layout for a group farm project.

Construction of Farm Facilities

Land preparation for growing crops involves removing native vegetation and leveling the terrain. Most public land in the ES area is covered by brush and grass. (See Figure 1-1). Brush is normally eliminated with a disk plow pulled behind a caterpillar-type tractor. (See Figure 1-2). This breaks up the brush, destroys the root system, and prepares the soil surface for a crop seedbed. The chopped brush may be left on the ground to add mulch to the soil or it may be raked and windrowed for burning.

After the vegetation is removed some land leveling may be necessary. This is done with bulldozers or other earth moving equipment. Gully or ravine areas may be filled while hills and knolls may be graded down. However, land leveling may not be necessary on gently rolling topography since modern sprinkler systems are adaptable on terrain up to an 8 percent slope.

Irrigation Works

Under the 111,015 acres proposed action, it is assumed that about 11,136 acres (10 percent) would use groundwater and 99,879 acres (90 percent) would use water from the Snake River. Based on current groundwater use, it is projected that 11,136 acres in the Bruneau to Murphy area would be irrigated with groundwater (see Map 1-2). All other proposed action development would be watered from high-lift pump stations situated along the Snake River. Table 1-3 is a summary of the acreage under the proposed action and the two alternative levels of development (discussed in Chapter 8) that would be irrigated from the four different reaches of the Snake River in the ES area.

River Pumping Irrigation Systems: Facilities for a typical river pumping system are discussed in the Indian Hills CA project description in Appendix 1-2. Basically, the components are a pump plant, (see Figure 1-4), a penstock that transports water to the farm areas, and a distribution system that delivers water to the sprinkler heads in the fields (see Figures 1-7, 1-8 and 1-9). Once water has been pumped from the river, some projects may use a system of open canals and holding ponds. Others may use a completely enclosed pipe system. In all cases, mainlines to the fields would be pressurized to facilitate sprinkler application.

Construction of a river pumping system would involve bank excavating and river dredging for placement of the pump station, ditching and burying of the penstock pipe, and ditch digging where open canals are used. Extensive structural concrete work would be required in the construction of pump stations and booster pump decks.

Electric power from the Idaho Power Company System would be used to provide irrigation pumping pressure. Some existing pump stations in the ES area total more than 12,000 horsepower each. Pumping facilities of such size require installation of an electrical substation next to the pump station. Power distribution lines would also have to be built into the substation and throughout the farm project area to provide electricity to booster pumps that pressurize sprinkler irrigation systems. All powerlines would be of a design to prevent electrocution of perched raptors.

Deep Well Pumping: Based on the existing situation, deep well pumping would provide 80 percent of the irrigation water in the ES area between Bruneau and Murphy. Adequate water supplies have been found from depths of 100-700 feet. Providing irrigation water by pumping groundwater would normally require less elaborate facilities than river pumping. The well would likely be located on the farm unit itself. Water pumped to the surface would immediately be distributed into mainlines to the field, or into a holding reservoir with booster pumps, or into a canal with booster pumps for mainline pressurization.

Field sprinkler systems would be the same for groundwater or river water pumping. Based on current farming practices in the ES area, the



FIGURE 1-1. View of a native sagebrush landscape in the ES area that has good soils and potential for farm development.



FIGURE 1-2. A brush rake being used to windrow brush for burning in preparing the land for plowing.



FIGURE 1-3. The land on the left side of the fence has been cleared of sagebrush and the bare soil is ready for planting crops.

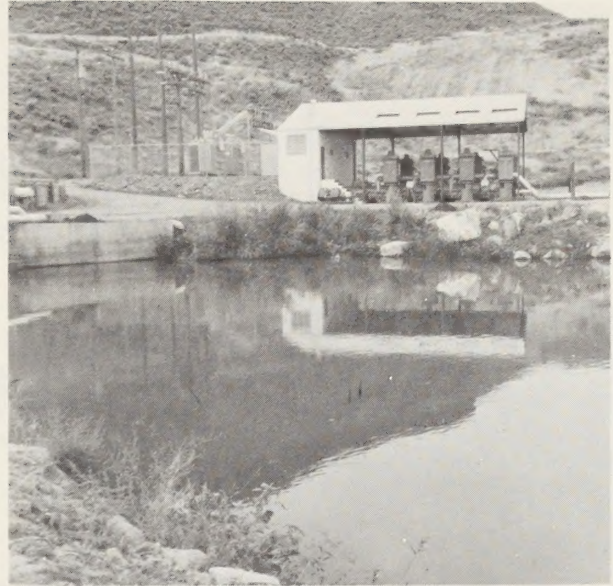


FIGURE 1-4. A river pumping station with covered pump deck and transformers in rear.



FIGURE 1-5. Aerial panorama of pump station located on a side channel of the Snake River. A buried penstock ascends the hill behind the station to deliver irrigation water to the bench high above the river.

TABLE 1-3

SUMMARY: ACREAGE TO BE IRRIGATED

	Salmon Falls/ King Hill Reach	King Hill/C.J. Strike Reach	C.J. Strike/ Murphy Reach	Murphy/Ore. Line Reach	Total
I. MAX. DEV. ALT.					
Snake River	58,635	68,649	4,032	7,050	138,366
Groundwater	-0-	21,816	16,128	-0-	37,944
TOTAL	<u>58,635</u>	<u>90,465</u>	<u>20,160</u>	<u>7,050</u>	<u>176,310</u>
II. MIN. DEV. ALT.					
Snake River	1,350	15,210	462	4,680	21,702
Groundwater	-0-	5,040	1,848	-0-	6,888
TOTAL	<u>1,350</u>	<u>20,250</u>	<u>2,310</u>	<u>4,680</u>	<u>28,590</u>
III. PROPOSED ACTION					
Snake River	48,180	46,053	1,026	4,620	99,879
Groundwater	-0-	7,032	4,104	-0-	11,136
TOTAL	<u>48,180</u>	<u>53,085</u>	<u>5,130</u>	<u>4,620</u>	<u>111,015</u>

SOURCE: IDWR and BIM Idaho State Office, 1978



FIGURE 1-6. This booster pump takes water from the canal and pumps it into aluminum mainline pipe which delivers it to sprinkler heads in the field.



FIGURE 1-7. Side roll sprinkler equipment in a sugar beet field.



FIGURE 1-8. A solid set sprinkler system irrigating winter wheat that has recently been planted. This system is commonly used in the ES area.



FIGURE 1-9. This pivot sprinkler rolls in a complete circle around its pivot point. Most pivots can cover about 140 acres. Sprinklers are located along the complete length of the pivot arm.

sideroll sprinkler is the most common system used. (See Figure 1-7). Normally, two sideroll units 1320 feet long are used in a 40-acre field. Sprinkler head pressure is normally 70 pounds per square inch (psi) with sprinklers spaced along the length of the pipe. The unit is connected to risers located along the buried mainline. After each irrigation "set", the system is moved by a gas or electric motor located at the middle of the unit. Duration of the sets depend on weather conditions and the type of crop being irrigated.

Other Farm Facilities

There are a number of other items that would be typically associated with the new farm developments. The perimeter of the farm project would be fenced to keep range livestock out. Fences would have to be constructed to allow passage of wildlife and yet meet livestock needs.

New access and farm roads would be required. It is assumed that these roads would be built on section lines (1 mile apart) within the interior of the farm project in a grid type pattern. Roads would be built to road district standards with a gravelled surface about 34 feet wide and 8 inches deep. Based on current conditions in the ES area, it is assumed that there would be 1.7 miles of new roads constructed for each square mile (640 acres) of farmland. There would also be lower grade dirt roads maintained along irrigation canals and powerlines, edges of fields, fence lines, etc.

Farm shop buildings, equipment storage yards, and potato sheds would have to be constructed. Some residences would be established; under the CA, a residence is required for each farm unit. Residences could be mobile homes or new permanent-type homes. Based on past DLA projects in the ES area, most farm units would not have residences established on them if it was not required. It is assumed that these non-crop land uses would take up about 3 percent of each farm unit acreage.

Farm Operations

For the purposes of analysis, it is assumed that a farm unit would be a joint filing of a husband and wife. In most cases, this has occurred in the past and allowed a family to farm a larger amount of land. In many cases, sons and daughters who meet filing requirements would also file along with their parents to secure even more acreage for the family operation.

A husband and wife would qualify for 320 acres under the CA and 640 acres under the DLA. Where groundwater would be used as the irrigation source, the two entrymen (husband and wife) would probably plan development of the land independent of other entrymen. Where river water was to be used, they would likely be members of a larger group of entrymen.

Crops

Based on agricultural practices in the ES area, it is anticipated that six crops would be grown on the new land opened up under the proposed action. It is assumed that these crops would be grown on a long-term sustained basis under the rotation shown in table 1-4. Table 1-4 is a summary of the actual 5 year average yields acquired from Twin Falls, Elmore, and Owyhee counties (Statistical Reporting Service, 1978). The figures represent productions similar to that for the proposed agricultural development.

TABLE 1-4
CROP COMPOSITION OF TYPICAL
DLA AND CA FARM UNIT

<u>Crop</u>	<u>%Crop Composition On Farm</u>	<u>Average Yield per Acre</u>	<u>Crop Acres Under DLA Farm Unit</u>	<u>Crop Acres Under CA Farm Unit</u>
Potatoes	22	315 cwt	136.4	68.2
Dry Beans	21	18.75 cwt	130.2	65.1
Winter Wheat	17	75 bu	105.4	52.7
Barley	17	75 bu	105.4	52.7
Sugar Beets	17	20 tons	105.4	52.7
Alfalfa	6	5.5 tons	37.2	18.1
			* 620.0	* 310.0

* 20 acres (3%) under DLA and 10 acres (3%) under CA are considered non-crop acres ,(roads, buildings, powerlines, etc.).

SOURCE: Idaho State Office BLM and Idaho Department of Water Resources 1978

Table 1-5 depicts planting and harvesting dates, fertilizer utilized, and consumptive water used by the various crops during the growing season. Potatoes are the highest value cash crop of the six listed. Potatoes normally comprise at least 50 percent of the crops grown on new irrigated land during the first few years since yields are higher and disease less likely. The percent crop compositions in Table 1-4 represents a likely crop mix after the first three or four years of farming.

Farming Practices

Farming operations are typical of highly mechanized practices used elsewhere in the United States. Efficient water application is possible through the use of sprinkler systems. It is possible to control the amount of water applied to crops more effectively with sprinklers than

surface gravity irrigation. Very little water is left over to run off the land after the irrigation cycle or "set". All irrigable ground surfaces are farmed under clean farming practices and there is little opportunity for weedy vegetation to be established around the perimeters of fields since crops are planted right up to roadways. (See Figure 1-11). Agricultural consultant services are available to advise farmers on chemical application and the latest technology to maximize crop yields. Pesticides and herbicides are applied in amounts prescribed by the Environmental Protection agency. Custom farming is a common practice which allows the farmer or land owner to purchase certain types of the farm work (planting, harvesting, spraying, etc.,) from firms or individuals that specialize in the work.

Many farmers in the ES area lease rather than own the land they farm. These tenant farmers have various pay-back arrangements with the land owner. In many cases sharing crop yields replaces cash rental.

TABLE 1-5
CROP INFORMATION

AVERAGE CONSUMPTION WATER USE
-inches/month-

Crop	Planting Date	Harvesting Date	Chemical Fertilizers	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	TOTAL
Potatoes	April 25- May 25	Sept. 10- Oct. 23	nitrogen phosphate zinc sulphur	.07	1.21	4.77	9.92	8.69	1.21		25.87
Dry Beans	May 15- June 1	Late Aug.- Early Oct.	nitrogen phosphate zinc		.98	4.50	8.45	4.64			18.57
Winter Wheat	Sept. 28- Oct. 20	July 25- Aug. 15	nitrogen phosphate	.94	3.79	7.85	8.96	.64			22.18
Barley	March 15- April 20	July 25- Aug. 15	nitrogen phosphate	.83	3.59	7.33	6.85	.55			19.15
Sugar Beets	March 20- April 15	Oct. 15- Nov. 10	nitrogen phosphate zinc	.27	1.86	4.08	8.05	8.01	4.73	1.51	28.51
Alfalfa	Sept. 1-10 and April 10-15	June 1-18 and July 8-14 and Aug. 15-24	nitrogen (seedlings) phosphate		2.79	6.25	8.53	6.91	3.91	1.33	29.78

SOURCE: Extension Agriculture Agent, Elmore County, 1978



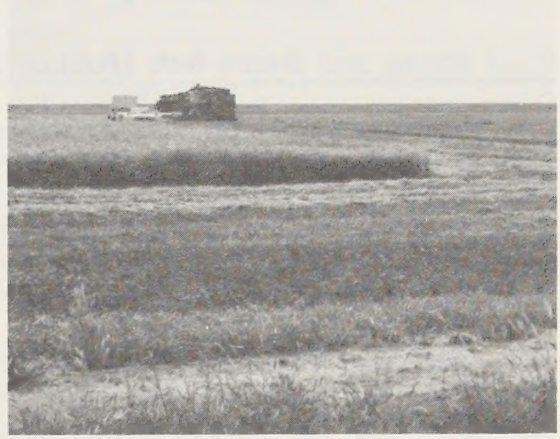
FIGURE 1-10. View of a DLA project developed in the early 1970's. Potato sheds and other buildings are about one mile in the distance.



FIGURE 1-11. This photo depicts clean farming practices where weedy vegetation is prevented from establishing along roadway and perimeters of fields. Photo was taken in spring before planting.



Alfalfa windrowed and ready to bale.



Harvesting grain.



Digging potatoes.

FIGURE 1-12. Farm Scenes.

STATUTES RESTRICTING FARM DEVELOPMENT

There are a number of laws that could prohibit farm development in certain locales in the ES area. These statutes would have to be complied with before farm expansion was approved on public land.

Wild Horse and Burro Act (Public Law 92-105)

This law requires BLM to protect, manage, and control wild horses on public land. To do this, BLM must prepare a wild Horse Management Plan (WHMP) for each herd, in conjunction with the Bureau's Multiple Use Planning System. The WHMP will designate specific herd range, determine optimum herd size, and provide management practices to adequately protect, maintain, and manage the herd.

There are two wild horse herds within the ES area. The Owyhee herd is presently being managed under a WHMP. A WHMP has not yet been prepared for the Saylor Creek herd, though one is scheduled for completion by 1983. Until the WHMP for the Saylor Creek herd is completed, decisions on whether or not to allow farm development in areas used by the herd would have to be postponed. Once the WHMP is completed, agricultural development could be precluded in certain areas that would be devoted to management of the herd.

Endangered Species Act of 1973 (Public Law 93-205)

This law protects plants and animals on federal threatened or endangered species list. The BLM may not allow actions, such as farm development, that could jeopardize the continued existence of any listed species. At this time the Northern Bald Eagle is the only endangered species on the federal threatened or endangered species list which occurs in the ES area. As is required under Section 7 of this Act, consultation was initiated with the U.S. Fish and Wildlife Service (FWS) regarding impact of the proposed action on the Northern Bald Eagle. On September 1, 1978, BLM received a memorandum from FWS stating that the Bald Eagle would not be jeopardized by the proposed action.

There are, however, five plant species in the ES area which are proposed candidates to Idaho's threatened and endangered species list (these plants are listed in Chapter 2, Table 2-7). BLM is required to consider proposed state threatened and endangered species as if they were listed on the federal threatened or endangered list, affording full protection of the Endangered Species Act. As a result, farm development would not be allowed on locations that were inhabited by these plant species.

Wilderness Review Provision of FLPMA (Public Law 94-579)

Under Section 603 of FLPMA, the BLM is responsible for ensuring that all public land, including that within the ES area, is inventoried for wilderness characteristics as described in the Wilderness Act of 1964.

An accelerated inventory of the ES area has identified three Wilderness Study Areas totaling 62,641 acres. This includes 2,625 acres within the ES area and 60,016 acres of contiguous undeveloped land. Land uses that would impair the suitability of Wilderness Study Areas for preservation as wilderness will not be allowed, pending completion of studies, public review, and Congressional action as required by Section 603 of FLPMA.

Cultural Resources

There are a number of laws that protect paleontological, archaeological, and historical resources on public land. Some of the more important ones are the Antiquities Act of 1906, the National Historic Preservation Act of October 15, 1966, Executive Order 11593, and the National Environmental Policy Act of 1969. Basically, these statutes require the BLM to inventory, locate, and evaluate such resources before land disturbance or disposal can take place. Farm development could be prevented in locations where cultural resources were found to be eligible for inclusion in the National Register of Historic Places. The National Register of Historic Places is a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture maintained by the Secretary of Interior. The criteria for National Register inclusion and Federal agency responsibility under Section 106 of the National Historic Preservation act is found in Appendix 1-3.

Cultural resource surveys have not been completed for the entire ES area; therefore, before public land could be farmed under the proposed action, the BLM would complete cultural surveys under standard procedures as described in Appendix 1-4.

AUTHORIZING ACTIONS

BLM Authorization

The basic procedure for approving DLA and CA applications has been described earlier in this chapter. There would be other land use applications associated with farm development that would need BLM approval. Where public lands were crossed by powerlines, canals or roads, right-of-way (R/W) grants would be required from BLM. Right-of-way grants are also required where pump stations are located on public land shoreline of the Snake River. BLM would require road plans to be submitted as part of the overall project design. Access would be required so that state or public lands would not be isolated. Roads would have to be constructed to county road standards and be compatible with public transportation needs in the area. Once constructed, these roads would be dedicated into the county road systems for upkeep and maintenance. Top soil replacement and revegetation stipulations would be required where public lands were excavated for penstocks, canals, roads, pump stations, etc. Stipulations would be designed to minimize soil erosion where soil disturbance occurred.

In order to limit soil erosion and water pollution from excess irrigation water and local flash flooding, BLM would require settling ponds in certain instances. These check dams would normally be located in the farm projects on the farm unit itself. Public land may be made available for catchment ponds in those cases where such ponds could not be located on the farm unit. Settling ponds would help prevent gully erosion and eliminate surface irrigation return flows from entering and polluting water bodies such as the Snake River. In many circumstances, however, check dams would not be needed due to flat topography.

Where groundwater is proposed as the source of irrigation water, the BLM would require a temporary use permit (TUP) to enter upon the land for purposes of well drilling. TUPs are required primarily where adequacy of the water source is questionable. DLA and CA applications would be rejected if groundwater was found to be insufficient.

Once DLA and CA applications are approved and entrymen are allowed to begin farm development BLM relinquishes control of the land. Farming practices could not be specified by BLM under DLA and CA as they could under other authorities discussed in Chapter 8.

BLM would also authorize land uses on some of the 37,000 acre public purpose tracts interspersed throughout the farm areas. Once agricultural development occurred, there could be land needed for sanitary landfills, sand and gravel pits, airstrips, and public service facilities such as road maintenance yards. Commercial business locations might also be needed. BLM could sell or lease public land under the Recreation and Public Purposes Act (R&PP) to government agencies for airstrips, sanitary landfills, or maintenance work. The Materials Act of 1947 would authorize local government entities to extract sand and gravel by a Free Use Permit (FUP) or private firms could buy or lease public land under Sections 203 and 302 of FLPMA for purposes of establishing a business location.

Other Agency Authorization

The Corps of Engineers must authorize and issue permits for any diversion structures, such as pump stations, located downstream from Walters Ferry on the Snake River. This is to assure that river navigation is in compliance with Section 10 of the Rivers and Harbors Act. The Corps also requires permits under Section 404 of the Clean Water Act of 1977 for placement of dredge or fill material when facilities are constructed in the Snake River.

The Idaho Department of Water Resources (IDWR) licenses irrigation water uses. The prospective farmer files a permit application for irrigation water, be it Snake River water or groundwater. The permit application appears as a public legal notice in the local newspaper. If no protests are received, the permit can be approved by the IDWR. The IDWR Director must consider five factors before a water right is issued. These are: the applicant's financial resources, available water, the possibility of conflict with other water rights, the applicant's good faith, and if it would be in the local public interest. The permit

holder can then proceed with the necessary construction and eventually submit proof of application of the water to beneficial use within the time specified by the permit (normally five years). After an affidavit of proof of beneficial use is submitted, IDWR personnel inspect the development, and a water right (license) is issued if conditions of the permit have been satisfied.

INTERRELATIONSHIPS

This section briefly discusses other proposed projects, studies and land use planning that are closely related to the proposed action. They are found both in and adjacent to the ES area and several are depicted on Map 1-4.

With Other BLM Programs

The Snake River Birds of Prey Natural Area (see Map 1-4), less than 30 miles south of Boise, was established in 1971 to protect wintering and nesting habitat for birds of prey. The Natural Area stretches along 33 miles of the Snake River and encompasses both the river bottom and steep volcanic cliffs that provide nesting habitat for the densest nesting population of raptors in North America. Golden eagles, prairie falcons, red-tailed hawks, and eleven other species of raptors are found.

In 1975, 275,000 acres of public land surrounding the Natural Area were put under administrative moratorium by BLM. In 1977, the Secretary of Interior added another 234,000 acres to the moratorium area. This area is called the Birds of Prey Study Area (see Map 1-4) and was established to protect the prey habitat for the raptors during intensive research investigations. These studies determined the biological needs of the birds of prey ecosystem, and recommended a boundary for the area to provide permanent protection for these raptors.

To maintain the study area in its natural state while research was in progress, the public land in this study area was closed to land disposal, oil and gas leasing and geothermal leasing. About 64,000 acres are under DLA and CA application.

A final boundary and legislation for permanent protection of the area will be submitted by the Secretary of Interior to Congress in early 1980. This recommendation was examined in an environmental statement released in June of 1979.

Birds of Prey Study Area

The Snake River Birds of Prey Natural Area (see Map 1-4), less than 30 miles south of Boise, was established in 1971 to protect wintering and nesting habitat for birds of prey. The Natural Area stretches along 33 miles of the Snake River and encompasses both the river bottom and steep volcanic cliffs that provide nesting habitat for the highest

concentration of raptors in North America. Golden eagles, prairie falcons, red-tailed hawks, and ten other species of raptors are found.

In September 1977, over 500,000 acres of public land surrounding the Natural area were put under administrative moratorium by the Secretary of Interior. This is referred to as the Birds of Prey Study Area (see Map 1-4) and was established to determine the precise food and habitat needs of the birds. In addition, the study will determine the basis for proposing a boundary that will provide permanent protection for the raptors.

To maintain the study area in its natural state while research is in progress, the public land in this study area is closed to land disposal, oil and gas leasing and geothermal leasing until permanent protection is established. Much of this study area is under DLA and CA application.

After data is analyzed, a final boundary recommendation will be submitted by the Secretary of Interior to Congress for possible legislation. This recommendation will be examined in an environmental statement scheduled for release during the last half of 1979.

Livestock Grazing Environmental Statements

The BLM Boise District is scheduled to complete livestock grazing ESs for the Owyhee Planning Unit (PU) in 1980, the Bruneau and Kuna PU's in 1982 and Saylor Creek and Bennett Mountain PU's in 1984. Forage inventories will be conducted to determine current and potential livestock carrying capacities before these ESs are started. With data obtained from these inventories, a revised grazing management program will be written to form the basis of the grazing ESs.

With Other Federal Programs

Oregon Trail

In 1977, the Bureau of Outdoor Recreation published a study report which recommended that the route of the Oregon trail be designated as the Oregon National Historic Trail. During 1978, legislation was enacted in the Omnibus Parks Bill, which included the Oregon Trail within the National Trails System as a National Historic Trail. The National Park Service will coordinate preparation of the plan scheduled to be completed in 1981. This management plan will be directed toward the protection of existing trail remnants, the trail environment and public enjoyment of the trail. Map 104 illustrates the Oregon Trail route through the ES area.

Hagerman Fauna Sites National Natural Landmark

Map 1-4 shows the location of the Hagerman Fauna Sites National Natural Landmark. It is recognized as one of the most important Pliocene fauna fossil areas in the world. BLM has management

responsibility for the 3,875 acres of the public land involved. The National Park Service completed a study in 1974, recommending the fauna beds be included in the National Monument System. Management of the area is oriented towards preserving the scientific values of the fossil beds.

With Other State Proposals

Map 1-4 shows locations of two low-head hydroelectric dams that are currently under study in the reach of the Snake River which flows through the ES area. These facilities would be constructed by Idaho Power Company (IPC). These dams would have low storage capacity and would be used principally for run-of-the river hydrogeneration. If these low-head dams were eventually constructed, they would help meet increased electricity demand created by new irrigation pumping in the ES area.

Wiley Dam

Wiley Dam would be located about two miles southwest of Bliss. It would be an earthfill structure about 100 feet high and create a reservoir pool of about 620 surface acres which would inundate about 7.5 miles of free flowing river channel. The power plant could produce about 465,000 megawatt hours (MWH) of power annually. Wiley Dam would have a maximum output of about 80 megawatts (MW) with 37.5 megawatts available 90 percent of the time.

Dike Dam

Dike Dam is proposed to be located 12 river miles below Wiley Dam. It would be about 50 feet high and flood about 6.5 miles of the Snake River canyon. This facility would have a capacity of 50 MW while producing about 26 MW 90 percent of the time.

The Bruneau Plateau Water Development Project

This project is proposed by the Idaho Water Resource Board and could involve building a new canal beside the present High Line Canal in Twin Falls County. It would be constructed west across Twin Falls and Owyhee Counties. Under the proposal, Snake River winter flow water would be diverted at Milner Dam through the new canal. The water would flow across Salmon Falls Creek via a large inverted siphon and would flow westerly through an open canal, located approximately on the 4,000 foot contour level. It would finally empty into two reservoirs used for irrigation water storage (see Map 1-4). The reservoir dams would be located on Saylor Creek and Deadman Creek drainages. Core drilling to help determine feasibility has taken place at the proposed dam sites. Deadmans storage capacity would be 116,000 acre feet while Saylor Creek Reservoir could hold 330,000 acre feet. There is a possibility of some

hydroelectric power generation along the canal itself and from irrigation water releases from the reservoirs. The Bruneau Plateau Water Development Project is conceptual at this point, but feasibility studies have been funded by the Idaho State Legislature. The study should be completed sometime in 1981. If ever constructed, this canal could help eliminate rising costs to farmers of high-lift pumping directly from the Snake River. Much of the public lands within the ES area could be irrigated by this proposal, primarily in the Saylor Creek Planning Unit. This project is addressed further in Appendix 8-2 under a discussion of off-stream storage irrigation development.

Idaho State Outdoor Recreation Plan (SCORP)

Both the Oregon Trail and the Hagerman Fauna Sites are mentioned in the 1977 Idaho State Outdoor Recreation Plan (SCORP) as being significant recreation attractions. It is the goal of the SCORP to "maintain, identify, and protect outstanding examples of Idaho's natural, cultural, recreational and historical resources for the future enjoyment of Idahoan's and visitors." The SCORP estimates that the regional demand for those types of recreation activities found within the ES area will more than double between the year 1975 and 2000.

208 Water Quality Planning

This statewide water quality management plan is being developed by the Idaho Department of Health and Welfare. This planning effort deals with irrigated agriculture. It will establish Best Management Practices (BMPs) which are necessary to correct or prevent identified agricultural water pollution problems.

With Land Use Planning

BLM Planning

The ES area is covered by portions of four BLM planning units; Saylor Creek, Owyhee, Bruneau, and Bennett Mountain (see Map 1-2). Planning has been completed for three of these units and partially completed for the fourth.

The Saylor Creek plan was completed in 1972 and is scheduled for revision in 1983. Decisions allowed agricultural development of approximately 40,000 acres of public land in the Blue Gulch and Deadman Flat areas. Most of these 40,000 acres have been developed to date. The plan stated that additional farm expansion could be considered after more is known about environmental impacts, agricultural demands, and economic policies. This ES will address the question of more farm expansion.

The Owyhee and Bruneau Planning Units are covered by one plan, the West Owyhee. This was completed in 1975. It recommended that all public land in the ES area from the Bruneau River to the Oregon border

having Class I and II soils be available for farm expansion. Revision for the Owyhee Unit is scheduled for 1979 and the Bruneau Unit in 1981.

The Bennett Mountain Plan is not complete. Work on this planning unit has been stopped until a vegetation inventory is completed for the Bennett Mountain Grazing ES. Information from this ES will be used in the final plan. Preliminary recommendations are to allow farm development on Class I and II soils in an orderly sequence, considering economic benefits and environmental safeguards.

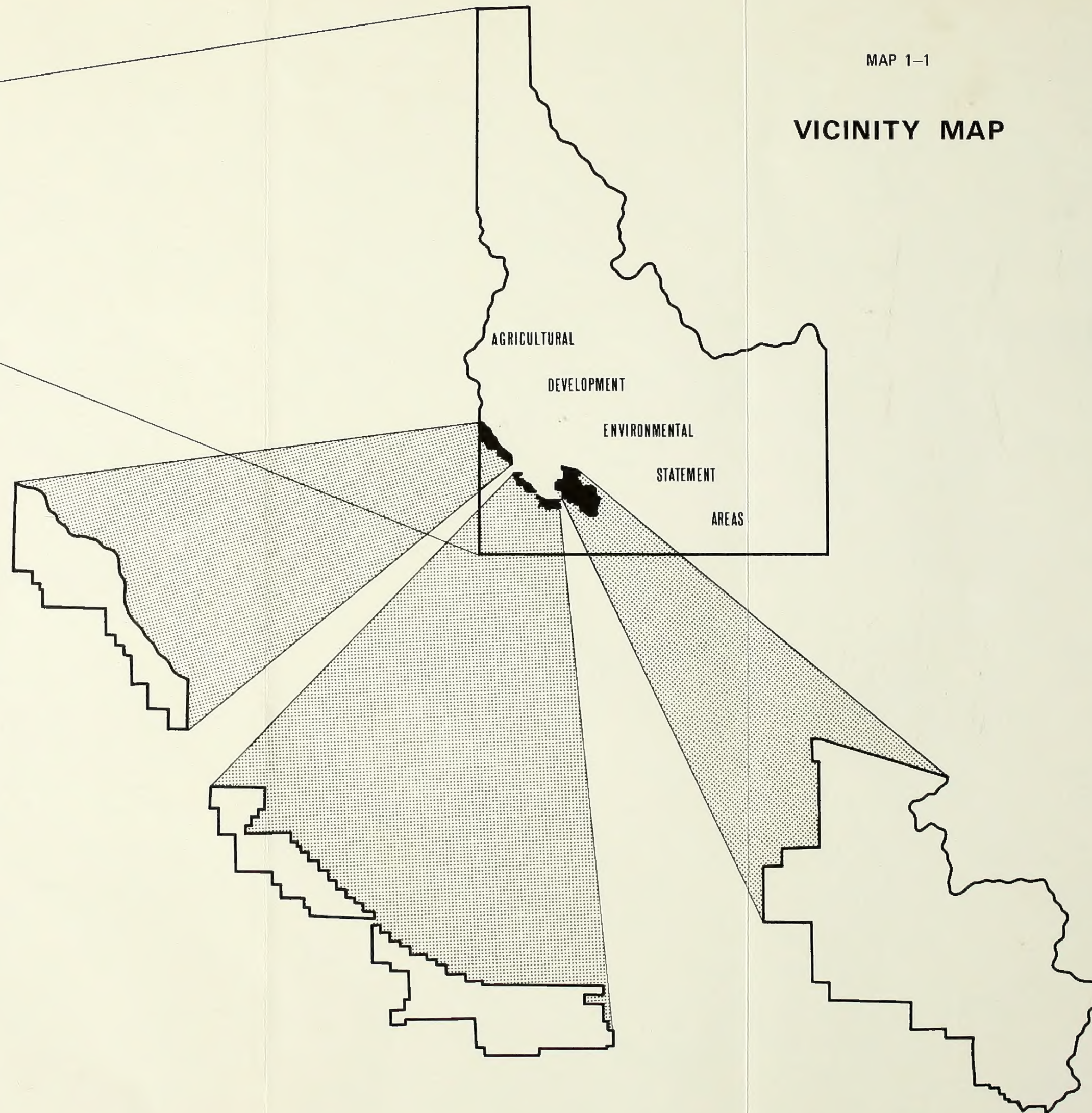
County Planning

The ES area is located primarily in Owyhee and Elmore Counties with the eastern portion in western Twin Falls County (see Map 1-2). All three counties have comprehensive land use plans which were completed in the mid 1970s; however, no zoning or land use restrictions have been implemented to enforce the planning recommendations.

All three land use plans allow for agricultural development on "the best soils," and have designated all reasonable land within the ES study area suitable for agricultural development. Both Twin Falls and Elmore Counties have indicated that minimum development be 40 acres per farm unit. Owyhee placed no size limitation.

If farming is eventually authorized as defined under the proposed action, BLM would update land use plans when specific farm projects were about to be approved. This updated BLM planning would be made available as input into county and local community land use changes. BLM would closely coordinate with county entities so that efficient use would be made of available planning resources.

VICINITY MAP



IDAHO

AGRICULTURAL
DEVELOPMENT
ENVIRONMENTAL
STATEMENT
AREAS

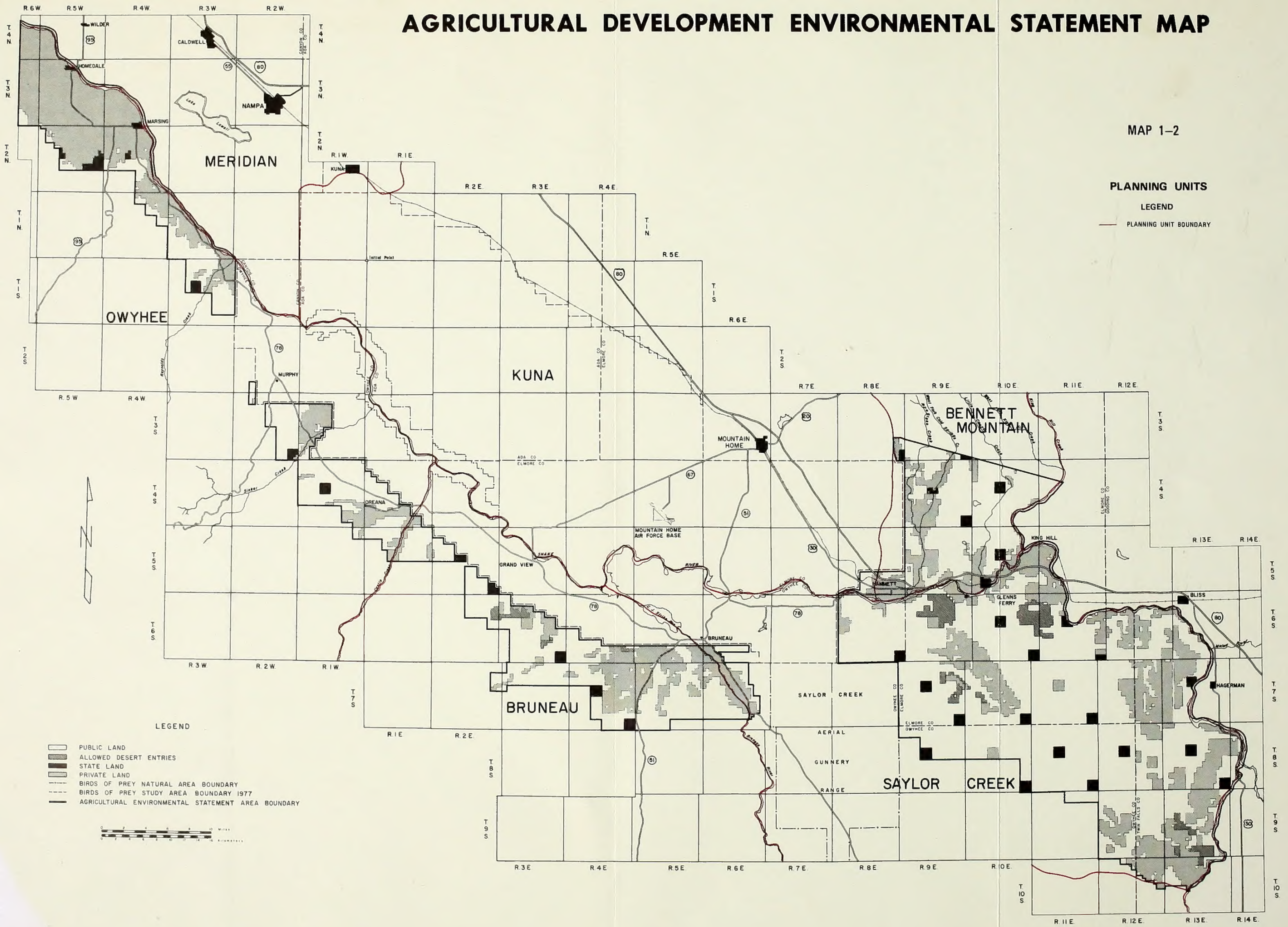
AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 1-2

PLANNING UNITS

LEGEND

— PLANNING UNIT BOUNDARY



LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



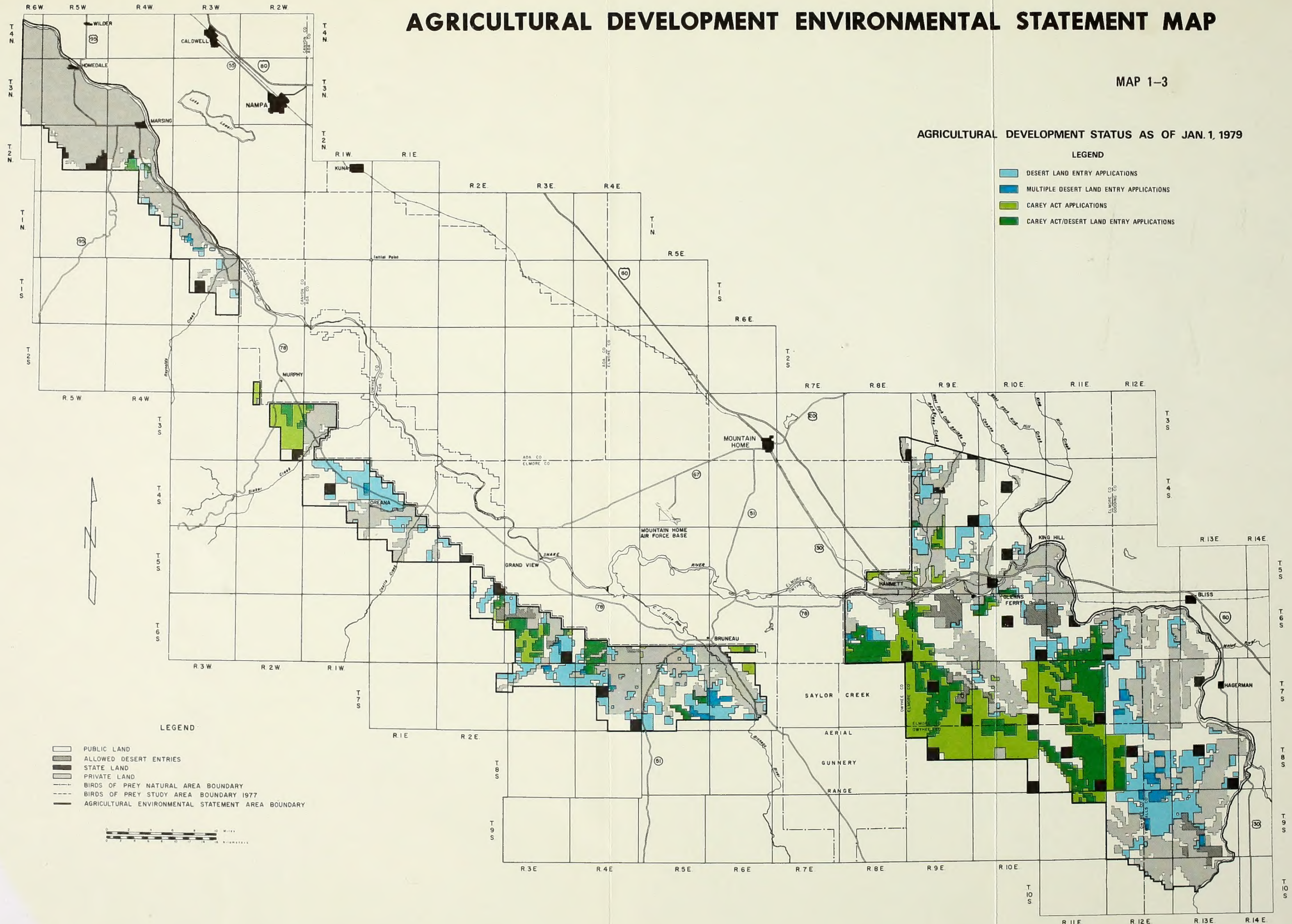
AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 1-3

AGRICULTURAL DEVELOPMENT STATUS AS OF JAN. 1, 1979

LEGEND

- DESERT LAND ENTRY APPLICATIONS
- MULTIPLE DESERT LAND ENTRY APPLICATIONS
- CAREY ACT APPLICATIONS
- CAREY ACT/DESERT LAND ENTRY APPLICATIONS



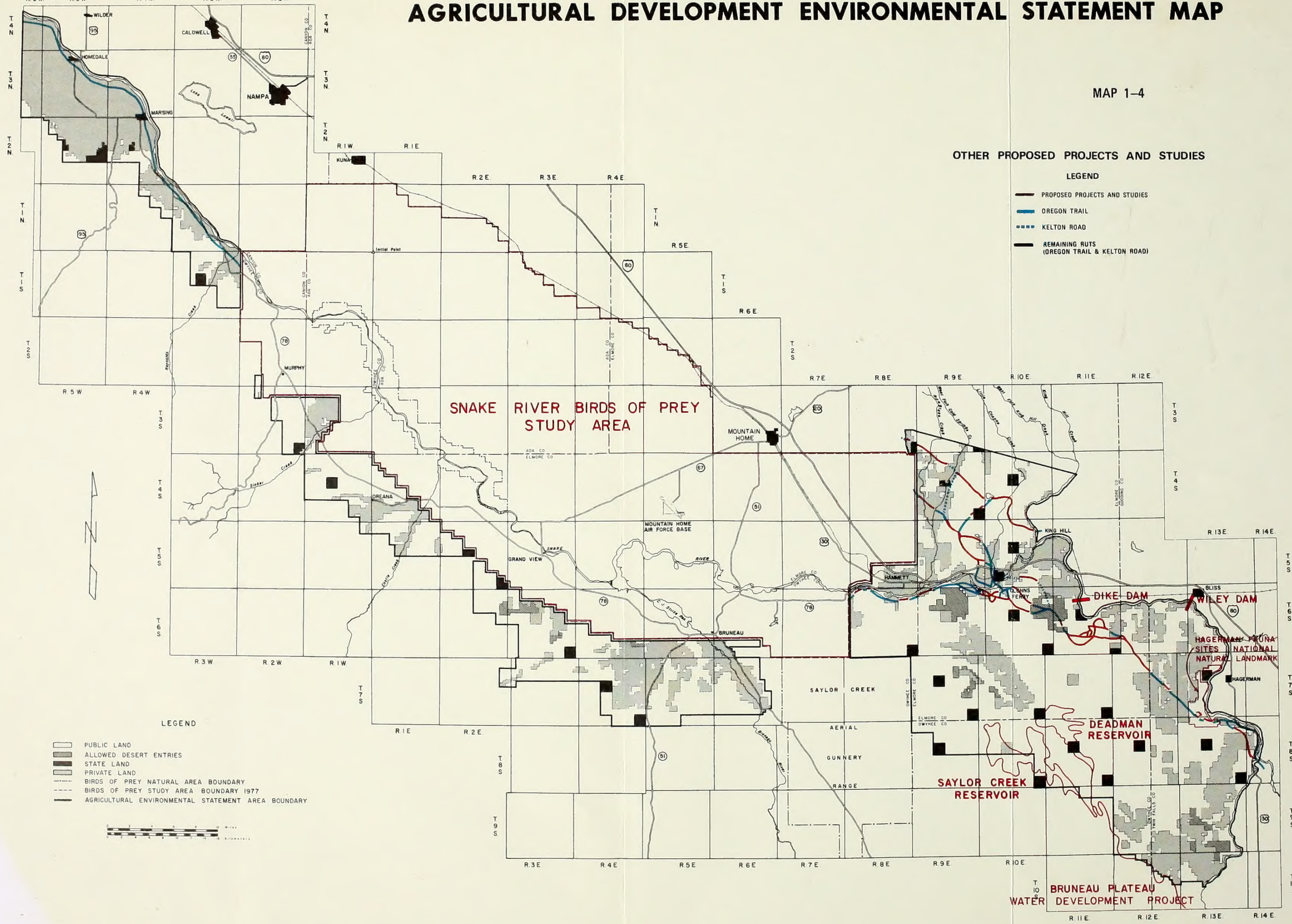
LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 1-4



OTHER PROPOSED PROJECTS AND STUDIES

LEGEND

- PROPOSED PROJECTS AND STUDIES
- OREGON TRAIL
- - - KELTON ROAD
- - - REMAINING RUTS (OREGON TRAIL & KELTON ROAD)

LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



Snake River Birds of Prey Study Area

DIKE DAM

WILEY DAM

HAGERMAN PRUNASITES NATIONAL NATURAL LANDMARK

HAGERMAN

DEADMAN RESERVOIR

SAYLOR CREEK RESERVOIR

BRUNEAU PLATEAU WATER DEVELOPMENT PROJECT

MOUNTAIN HOME

MOUNTAIN HOME AIR FORCE BASE

GRAND VIEW

BRUNEAU

SAYLOR CREEK

AERIAL

GUNNERY

RANGE

SAYLOR CREEK RESERVOIR

DEADMAN RESERVOIR

SAYLOR CREEK RESERVOIR

DEADMAN RESERVOIR

BRUNEAU PLATEAU WATER DEVELOPMENT PROJECT

CHAPTER 2

DESCRIPTION OF THE ENVIRONMENT

Chapter 2 describes the environmental and social setting in which the proposed farm development takes place. Emphasis is placed on those subjects most likely to be affected by the proposed action. The chapter is divided into two sections — a description of the present environment and a description of the future environment without the proposed action.

CHAPTER 2 DESCRIPTION OF THE ENVIRONMENT

EXISTING ENVIRONMENT

This section describes the area today. It pays particular attention to those resources, land uses, and socio-economic features that would be affected by the proposed action.

CLIMATE

Climate conditions are consistent throughout the ES area. The climate may be generally characterized as moderate to cool mean temperatures with warm to hot, dry summers and cool to cold winters. Precipitation is typical of semiarid regions, averaging approximately 8.7 inches per year. Also characteristic of the area are moderate to low relative humidities, wind conditions which range from slight to rather severe, an abundance of sunshine, and a moderate frequency of rain or snow storms. The growing season varies from 100 to 200 days with an average of 165 days.

The climate of the area originates principally from Pacific maritime air masses brought into the region by prevailing westerly winds. These air masses exert a modifying influence on temperatures and contain moisture which is the source of nearly all precipitation. Occasionally, cool polar air masses or warm continental air masses invade the region, displacing or modifying the effects of the maritime air masses. These latter types are partly responsible for the clear weather, low humidities, and temperature extremes. Wind conditions vary with the season of year. Windy conditions are characteristic in the spring while summers are usually calm. At the Gooding Airport (10 miles east of the ES area) wind velocities exceed 18 mph about 9 percent of the time in March, April, and May. During the months of July, August, and September wind velocities exceed 18 mph only 2 percent of the time (see Figure 2-1).

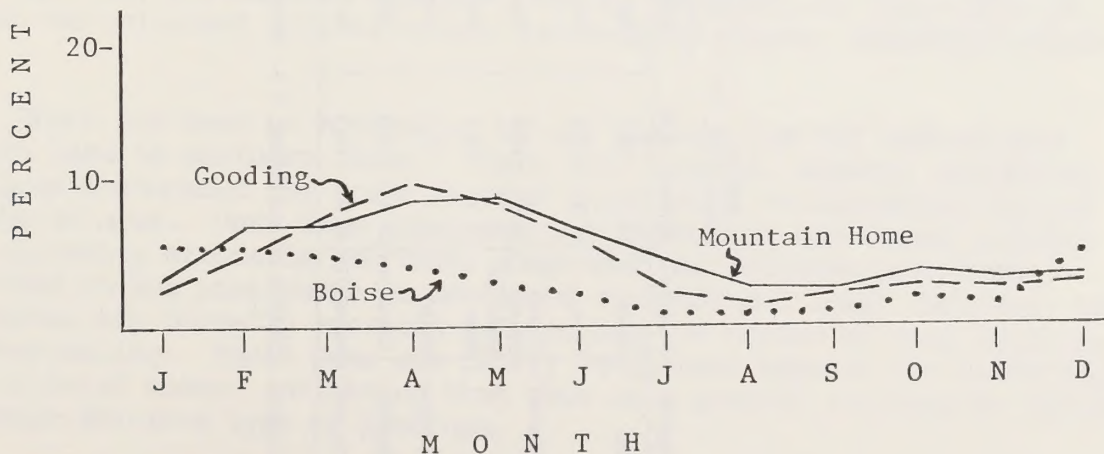


FIGURE 2-1. Percent of time wind exceeds 18 MPH (by month) for three stations in southern Idaho.

SOURCE: Climatological Handbook, Pac. NW River Bas. Com.

TABLE 2-1
CLIMATIC SUMMARY

County	Station	Average Temperature, °F		Average Killing Frosts			Average Precipitation, Inches												
		January	July	Last in Spring	First in Fall	Growing Season, Days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Ada	Boise	29.1	75.2	Apr 21	Oct 23	177	1.32	1.33	1.32	1.16	1.29	0.89	0.21	0.16	0.39	0.84	1.20	1.32	11.43
	Kuna	29.0	72.0	Apr 24	Oct 14	173	1.12	1.03	1.20	1.03	1.37	0.88	0.19	0.14	0.40	0.79	1.18	1.03	10.36
Elmore	Glenns Ferry	30.5	76.4	May 6	Oct 3	150	1.25	0.94	1.02	0.75	0.90	0.59	0.25	0.14	0.25	0.55	1.05	0.99	8.68
	Mountain Home	28.3	73.7	May 3	Oct 6	156	1.04	0.87	1.10	0.84	1.02	0.73	0.24	0.15	0.30	0.65	0.93	0.91	8.78
Gooding	Bliss	28.1	74.2	Jun 3	Sept 24	113	1.24	0.92	0.92	0.66	0.88	0.61	0.22	0.11	0.27	0.55	1.05	1.11	8.54
Owyhee	Grandview	29.4	76.5	Apr 28	Sept 23	144	0.71	0.58	0.91	0.70	1.09	0.83	0.16	0.11	0.33	0.47	0.68	0.69	7.26
TwinFalls	TwinFalls	26.9	72.3	Apr 26	Oct 8	165	1.02	0.72	0.87	0.86	1.01	0.79	0.21	0.21	0.46	0.75	0.93	0.91	8.74

Source: Climates of the States, U.S. Department of Commerce, 1971.

At Mountain Home (about 15 miles north of the ES area), wind velocities are 8 percent and 3 percent, respectively. Wind direction in the ES area is westerly.

Figure 2-1 depicts wind conditions taken from three stations in southern Idaho. All three stations show the same seasonal wind characteristic - windy springs. This feature becomes increasingly important in light of the fact that spring is also the season of high farming activity.

Thunderstorms occasionally produce high intensity precipitation for brief periods but are confined to small areas. Other than localized situations, storms are not an important cause of floods in the region except as they occur in conjunction with heavy snow cover and frozen watershed conditions.

Table 2-1 shows weather information from recording locations which characterize the climatic conditions in the ES area.

AIR QUALITY

The existing air quality in the ES area is very good. However, it varies depending on the proximity to existing agricultural land, unpaved roads, etc.

Idaho has adopted the federal air quality standards. A number of air quality monitoring stations throughout the state measure total suspended particulates. Sulfur dioxide and hydrocarbons are not being monitored at this time. Particulate pollution is a primary concern in the ES area. Other measured pollutants are not present in significant amounts in the rural or agricultural areas in southern Idaho.

The state and federal air quality standards for particulates are divided into primary and secondary standards. The primary particulate standard (the point at which people of normal respiratory health start becoming ill) is presently set at 75 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The secondary particulate standard, set at $60 \mu\text{g}/\text{m}^3$, is that point at which the pollutant affects crops, landscaping plants, aesthetic values, etc.

There has been no monitoring of air quality for the undeveloped desert land in southern Idaho. There are, however, several monitoring stations throughout the state located in physical environments similar to the ES area. Data from these stations show that the annual primary and secondary standards for total suspended particulates have been exceeded during past years on developed agricultural land. However, the standards are normally exceeded only during the months of crop planting and harvesting. These data are fairly consistent between the differing agricultural areas, indicating that this is a general air quality characteristic for this type of land use.

In addition to the annual standards, there are 24-hour standards which must be met. Available data indicates that during the months involved in spring cultivating, planting, and harvesting one to three

days per month will have particulate concentrations on agricultural land that exceed the 24-hour primary standard. The increased particulate concentrations are due primarily to windy conditions.

In summary, areas with agricultural development will exceed the secondary standards during specific months of the year but seldom exceed the primary standards either for the 24-hour or annual time lengths.

In contrast to agriculturally developed areas, one monitoring station, located at the Craters of the Moon National Monument, illustrates the background total suspended particulates where no agricultural development is present. Data from this station show that air quality for this type of land never exceeds the annual primary standards, but does occasionally exceed the annual secondary standards during the spring and summer months when there are high winds and/or droughty conditions. This station does not reflect the same vegetation, soils, or climatic conditions found on the ES area, but does indicate that there are some background particulates in an area with no agricultural development.

GEOLOGY AND TOPOGRAPHY

The ES area is located within the Snake River Plain, a downwarped basin filled with interbedded lake, stream, and volcanic deposits. The area is underlain by sedimentary silt, sand, clay, ash, gravel, and basalt predominantly of Pliocene-Pleistocene age. Younger alluvial deposits are widespread throughout the region (see generalized geologic Map 2-1).

Much of the region, and most of the ES area, is flat-lying or of low relief, reflecting the nature of the underlying horizontal sediments and basalt flows. Elevation ranges from about 2,250 feet adjacent to the Snake River in the western portion of the ES area, to in excess of 4,000 feet in the extreme southeastern part of the area in the Salmon Falls Creek region.

With the exception of that portion of the ES area situated adjacent to Salmon Falls Creek, much of which is underlain by igneous rocks (Banbury Basalt), most land is underlain by Idaho Group sediments which, in some areas, include surface exposures of basalt interbeds. Those lands underlain directly by basalts are gently rolling or flat-lying.

Land in the Bruneau, Oreana, and Marsing regions is directly underlain by lake sediments with gravelly layers commonly forming a resistant "cap", resulting in a somewhat muted badlands-like topography.

SOILS

A detailed soil survey was conducted for the entire ES area using the Bureau of Reclamation Economic Land Classification System. All of the maps and photos are available at the Boise District Office. The soils were grouped into three productive and one nonproductive classifications; i.e., Class I, II, III and VI. Class I soils are most

productive. There are 439,303 acres of public land within the ES area. Of this amount, 347,812 acres are open to DLA and CA filing. Public land in the ES area available to filing have 65,294 acres (17%) of Class I soils, 74,616 acres (20%) of Class II soils, 82,916 acres (22%) of Class III soils, and 151,986 acres (41%) of Class VI (non-irrigable land).

The eastern portion of the ES area, including Saylor Creek, was mapped previously by the Bureau of Reclamation; the remainder of the ES area was mapped by the BLM at a scale of 1:24,000, using natural color aerial photos. A general soils map has not been included in this document due to loss of detail and clarity in the reduction process. The original soil survey photos can be found in the BLM Boise District Office and Saylor Creek Soil survey maps are located at the Bureau of Reclamation Office in Boise.

Appendix 2-1 contains a complete legend of criteria used in classifying the soils. Soils were mapped according to the physical qualities of the individual soil profiles. Factors considered were depth, texture, permeability, slope, erosion, parent material, and inhibitory factors. Each individual mapping unit is classified and identified with a descriptive symbol that is representative of the predominant soil properties.

Production figures given in Appendix 2-2 are taken from soil survey interpretation sheets of established soil series recognized within the ES area. Certain other soil series were identified during surveys, but were not officially classified and established because the nature of mapping was oriented toward crop production and irrigability, not soil series identification. Several of the soil series were found on more than one irrigability class due to the normal range of characteristics such as slope, depth, and texture found within a series. Production figures were derived from the appropriate soil phase peculiar to that class. Land was classified without consideration of its elevation or distance from water.

Class I

Class I land is well suited for irrigation development. The dominant soil textures are silt loams and loams, but range from sandy loams to clay loams. They are predominantly deep, dark brown to light brown, and friable. Soil depths exceed 36 inches over sand, gravel, rock, or hardpan. There are few areas of surface rock or gravels. Soil permeabilities range from 1.30 to over 2.00 inches per hour, and the water holding capacity exceeds 5 inches in the top 4 feet. The pH of the saturated soil surface ranges between 7.2 and 8.5. The topography consists of smooth, gentle slopes ranging from 0 to 4 percent. The soils do not have drainage problems or toxic amounts of salt or sodium within the profile.

Class II

Class II land is suited for irrigation and the production of row crops. Soil textures range from loamy fine sands to silty clay loams

with a predominance of silt loams and loams. These soils are moderately deep to deep or at least 20 inches to sands, gravels, or restrictive layers. The principal soil deficiencies of this land class are the moderately shallow depths and the slightly toxic amounts of salt and/or sodium. Topographic deficiencies include land with short irrigation runs and slightly undulating or moderately sloping surface relief. Small areas of rock outcrop exist in spots, but the depth to bedrock is generally greater than 6 feet. Soil permeabilities are slower in the finer textured soils, and the pH ranges from 6.2 to 9.0. Water holding capacity exceeds 3 inches in the top 4 feet of soil. Slopes range from 0 to 15 percent with few drainage problems.

Class III

Class III land is adapted more for the use of small grains and pasture and is considered marginal for row crops. Management should include 80 percent permanent cover within any crop rotation.

Soil textures can range from loam fine sands to clays with a predominance of loams and silt loams. Depth to gravels, rock, or hardpans is at least 10 inches, and some gravel and rock is found on the surface. Slopes range from 0 to 20 percent and can have rills and undulations varying from 16 to 24 inches that may require extensive cut and fill operations. Soil permeabilities can be low because of poor drainage and high concentrations of sodium. Water holding capacities exceed 2 inches in the top 4 feet.

The more predominant deficiencies for irrigation is the presence of slick spots (high sodium) and fine textured subsurface horizons. Areas of shallow soils or severely eroded slopes are also a prevalent problem. Some restricted drainage may occur in the lower portions of alluvial fans, low terraces, and shallow lava plains; but this is not a serious problem.

Class VI

Class VI land is considered non-irrigable. It is comprised mostly of basalt flows and outcrops, canyons, gorges, steep sloping lands, and mountain areas (USDI, Bureau of Reclamation, 1969).

The estimated average production from each of the three irrigable classes is given in Table 2-2. This information was derived from the Soil Conservation Service (SCS) Form 5s for established soil series identified within the ES area.

Present soil sheet (water) erosion was calculated using the Musgrave equation (see Appendix 2-3) for the highest and lowest limits of each irrigability class (Table 2-3). Actual erosion rates for soils within the ES area are more accurately represented by the lower figure, particularly within Class III and VI soils.

General soil erosion maps have been developed for existing land uses using the Universal Soil Loss equation based on the Idaho Water Resources Board Soil Survey. These maps show that most of the soil within the ES area is classified as having a slight erosion rate. General soil erosion maps can be seen at the Soil Conservation Service, Idaho State Office.

Wind erosion potential varies with the soil type. Windy conditions are most prevalent during spring months in the ES area. Wind erodibility group ratings which show the relative rates that soils will erode are in Appendix 2-4 with a detailed description of soil and wind erodibility criteria. Studies to determine the actual amount of wind erosion have not been conducted.

TABLE 2-2

ESTIMATED POTENTIAL YIELDS UNDER GOOD
MANAGEMENT USING IRRIGATION

Item	Class I	Class II	Class III
Sugar Beets (Tons)	26	19.5	13
Alfalfa Hay (Tons)	5.7	4.6	3.1
Potatoes, Irish (CWT)	357	290	210
Wheat (BU)	84	68	52
Corn, Silage (Tons)	23	21	16
Corn, Sweet (Tons)	7	5.7	-
Pasture (AUM)	16	13	11
Barley (BU)	105	88	65
Apples (BU)	540	500	-
Field Corn (BU)	-	46	-
Alfalfa Seed (lbs)	-	540	-

SOURCE: Soil Conservation Service Form 5's developed for some series within the ES area.

TABLE 2-3

PRESENT SOIL EROSION CONSIDERING THE END MEMBER
CONDITIONS OF EACH CLASS TONS PER ACRE

<u>Class</u>	<u>Soil Erosion Condition</u>	<u>Erosion Rate</u>	<u>Mean</u>
I	Low	.03	.16
	High	.30	
II	Low	.03	.59
	High	1.15	
III	Low	.26	4.24
	High	8.19	
VI	Low	.82	14.08
	High	27.31	

WATER RESOURCES

Water Supply

Surface Water

The major surface drainage through the ES area is the Snake River. The Snake is one of the nations largest rivers and serves many uses. Forty dams have been built on the Snake and its tributaries. Between 20 and 25 more have been proposed. Five dams have been built within the ES area for power purposes, water storage, and irrigation water diversion (see Map 2-2). The Snake is also valuable for a wide variety of recreational, wildlife, commercial, and industrial uses.

Average flows in the river vary widely, depending upon location and season (see Table 2-4). Most areas of the basin produce relatively little runoff. The Snake River plain receives only an average of about ten inches of precipitation per year. The mountains on the northern and southern edges of the plain are also quite dry. Flow fluctuations are mostly due to higher elevation snowpacks and the operational requirements for irrigation, flood control, power, and other uses imposed on downstream diversions and impoundments.

Most of the flow is derived from the Henry's Fork basin and the Snake River basin above Idaho Falls. Flows in the river, measured at Shelley, ranged from 67,300 cubic feet per second (CFS) to 288 CFS during the period 1915 to 1977. Much of this water is diverted for irrigation on the Snake River Plain above Milner Dam. Flows through Milner Dam, about 50 miles east of the ES area, during the same period have ranged from 40,000 CFS to 2 CFS. In about one-fifth of all years, the flow passing Milner averages about 275 CFS. The average flow is 2491 CFS (USGS, 1977). Map 2-3 illustrates flows at different gauging locations on the Snake River system. It also depicts the major tributaries of the Snake River in Idaho.

TABLE 2-4
SNAKE RIVER FLOWS (AVERAGE CFS) BASE CONDITIONS

Gauging Station	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Lower Salmon Falls	7636	8404	9344	9054	9500	10221	10767	7268	6533	6293	6513	7283
King Hill	9353	10183	11041	10929	11283	12117	12851	8804	8029	7568	7846	8762
C.J. Strike	9183	10392	11270	11299	11661	12637	13253	9140	7918	6736	6896	8071
Murphy	9559	10739	11541	11481	11911	12857	13509	9312	8106	6926	7124	8420
Brownlee (in flow)	14374	15002	16353	17453	19630	23583	27555	23397	20036	11143	10469	12718
Anatone	20907	22624	26894	27277	31269	34713	48839	65423	66256	28236	16656	17711

SOURCE: IDWR 48 year flow record.

Federal reservoirs on the Snake River and its tributaries are operated as a system to control the flows for irrigation of about 1.0 million acres above Milner (see Map 2-2). In years of low-flow all water in the Snake River is stopped at Milner during the irrigation season. Downstream flows in the river are mainly the return and inflows that occur downstream from Milner Dam. The largest source of water for inflow below the Milner Dam is Thousand Springs (near Hagerman) which flows from these springs year round at about 6,500 CFS. About one-fourth of this spring flow has been attributed to subsurface return flows from upstream irrigation (Idaho Water Resources Board, 1972).

The average flow of the Snake River at King Hill, about 65 miles below Milner, is about 9900 CFS. The characteristics of flow at King Hill, under present conditions of upstream use and control, are shown in Figure 2-2. Data for Figure 2-2 include water years 1928-1975. The lower line (minimum) represents largely the groundwater discharge from the Snake River Plain aquifer but also includes minor amounts of flow passing Milner, irrigation return flow, and flow from the Malad River and Salmon Falls Creek. The average line on Figure 2-2 is considerably higher, being influenced greatly by large flows passing Milner in the high runoff years.

About 2.5 million acres of land are irrigated on the Snake River Plain above King Hill. Nearly 675,000 acres of this land is supplied from groundwater sources. Reservoirs, totaling 5.7 million acre-feet (MAF) capacity, and natural streamflows supply the remainder (USGS, 1978).

The river gains only small amounts of flow between King Hill and the Oregon border. There are numerous intermittent creeks that drain across the ES area into the Snake River (see Aquatic Environment Map 2-4). Most of these drainages only run water during early spring or during flash, high intensity rain storms. The Bruneau River contributes about 260,000 acre-feet per year, and there are minor amounts from other small tributaries. Existing diversions for about 140,000 acres in the ES area reduce the annual flow about 360,000 acre-feet in this reach. The diversions, which are all withdrawn during the summer months, substantially reduce the summertime flows downstream. The Bruneau River, near its mouth, has a record (during a 20-year period) of from 6,500 CFS to 25 CFS. Flows varying from 1,360 CFS to 21 CFS have been recorded on Salmon Falls Creek below Salmon Falls Creek Dam (Idaho Water Resources Board, 1972).

Seasonal characteristics of the flow of the Snake River near Murphy are shown on Figure 2-3.

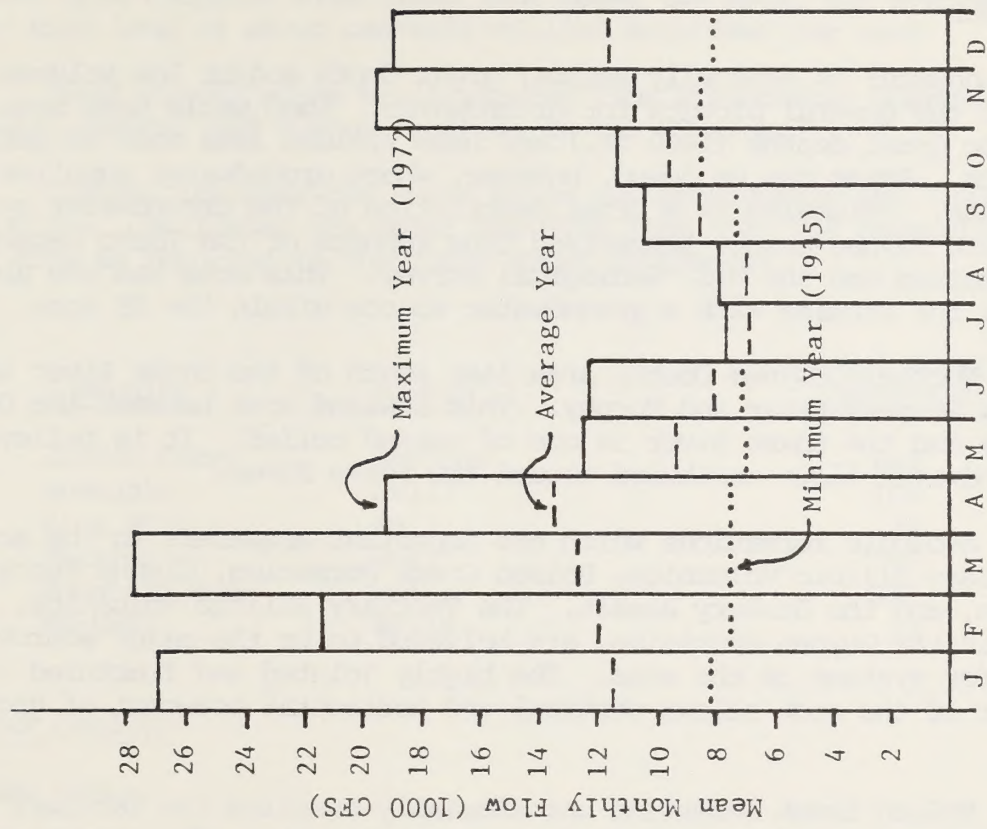


Figure 2-3. Characteristics of Snake River flows at Murphy under base conditions (Source: IDWR 48 year flow records)

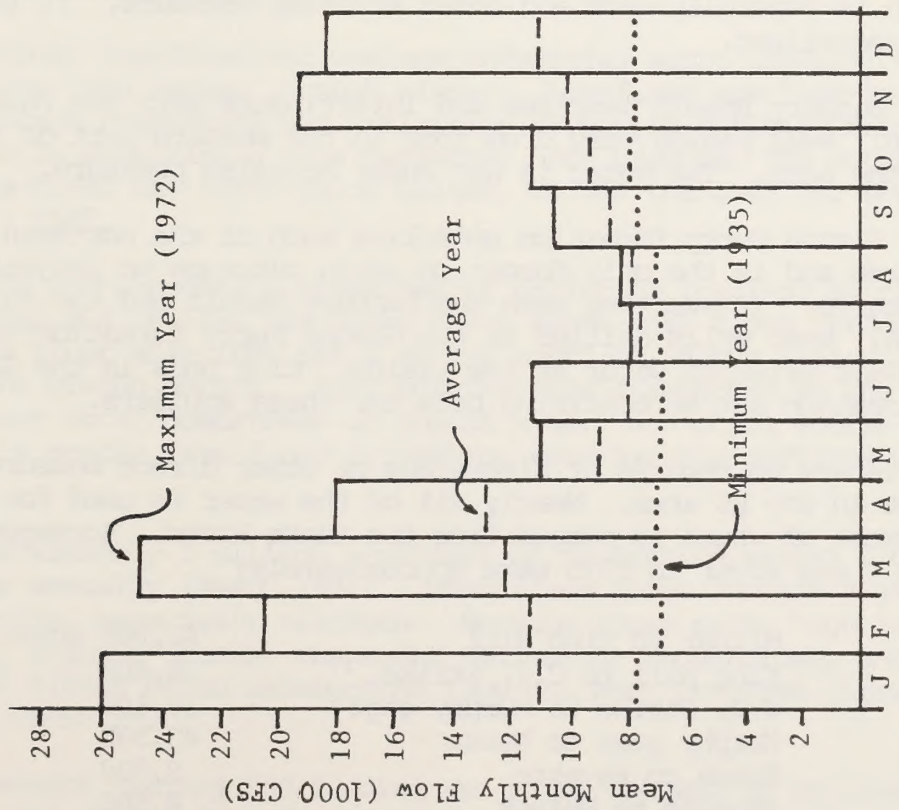


Figure 2-2. Characteristics of Snake River flows at King Hill under base conditions (Source: IDWR 48 year flow records)

Groundwater

Groundwater is generally scarce; great depth and/or low volumes represent the general picture for groundwater. Some wells have been drilled to great depths (1000 ft.) and have yielded less than 50 gallons per minute. Areas can be found, however, where groundwater supplies may be adequate. Following is a brief description of the groundwater system in Northern Owyhee County summarized from reports of the Idaho Department of Reclamation and the U.S. Geological Survey. This area has the greatest potential for farming with a groundwater source within the ES area.

The Northern Owyhee County area lies south of the Snake River between the Bruneau River and Murphy. This lowland area between the Owyhee Mountains and the Snake River is one of varied relief. It is believed the groundwater flows northward toward the Snake River.

The geologic formations which are important aquifers in the area are Tertiary Silicic Volcanics, Poison Creek Formation, Glens Ferry Formation, and the Banbury Basalt. The Tertiary Silicic Volcanics, exposed in the Owyhee Mountains, are believed to be the major source of the aquifer systems in the area. The highly jointed and fractured character of the rock allows vertical and horizontal movement of groundwater.

The Poison Creek Formation unconformably overlies the Tertiary Silicic Volcanics and is recharged by upward leakage. The formation is composed primarily of bentonite silt and poorly consolidated shale. The fine-grained nature and high bentonite content of most of the formation restricts the yield to wells in the area. The water present in the formation is generally warm and under artesian pressure. It is often highly mineralized.

The Banbury Basalt overlies and interfingers with the Poison Creek Formation. Well yields vary from poor in the western part of the area to good in the east. The water is hot under artesian pressure.

The Glens Ferry formation underlies much of the northern Owyhee County area and is the only formation which outcrops on project lands to any degree. It overlies both the Banbury Basalt and the Poison Creek formation. Most wells drilled in the Glens Ferry formation have yielded warm artesian water at low yields. Clay beds in the Glens Ferry formation act as confining beds for these aquifers.

There are no records of diversions or other direct measurements of water use in the ES area. Nearly all of the water is used for irrigation, most of which is pumped from the Snake River. Acreages irrigated from the Snake River in 1975 were approximately:

Milner to King Hill	42,000 acres
King Hill to C.J. Strike	78,600
C.J. Strike to Murphy gage	18,100
Murphy gage to Nyssa	43,500
Nyssa to Payette	8,000
Payette to Weiser	4,500
	<hr/>
	195,100 acres

Based upon computed diversions from power use data, the average diversion for this land is about one-half million acre-feet per year.

About 42,000 acres are irrigated from groundwater sources in Twin Falls, Elmore, and Owyhee counties in the ES area.

Communities near the Snake River use groundwater for domestic water supplies. Following are water use data from 1960 for communities in the ES area as reported in the Idaho Water Inventory:

<u>Community</u>	<u>Source</u>	<u>Annual Diversion (acre-feet)</u>
Glenns Ferry	Springs	841
Homedale	Wells	168
King Hill	Well	39
Marsing	Well	67
Mountain Home	Wells	841
Murphy	Wells	22

Water Quality

Snake River

The most serious pollution loading in the ES area of the Snake River originates from upstream municipal and industrial wastes, irrigation return flows from gravity systems, and low-flows (IDWRB 1972 and IDHW 1978, USDI 1968, FWPCA 1960).

Critical low-flows and maximum industrial waste production occur mainly from late summer through winter. Low-flows are "man-made" because storage regulation and irrigation diversion outweigh natural influence in determining flow patterns. For example, the entire flow of the Snake River may cease below Milner, as was the case for several months in 1977.

Table 2-5 presents a breakdown of pollution loadings by river reach. Map 2-4 depicts the Snake River reach that flows through the ES area from river mile (RM) 586.5 at the mouth of Salmon Falls Creek to RM 410 at the Oregon border. Most point-source discharges in the middle Snake River occur downstream of the ES area. Non-point source pollution loading is mostly from flood irrigation return water upstream of the ES area.

Approximately 3 million acre-feet of irrigation return flows enter the river annually (PNRBC 1970). Subsurface flows contain high levels of nutrients, especially nitrogen. Surface flows carry high levels of bacteria, organic debris, suspended sediments, phosphorous, and pesticides if little or no underground flow has been involved (Steward et al 1976 and PNRBC 1970).

Livestock grazing and feeding are major sources of nutrient, BOD (biochemical oxygen demand) and bacterial loading to the area of the

TABLE 2-5

POINT-SOURCE POLLUTION LOADINGS WHICH MOST AFFECT
THE ES AND DOWNRIVER REACH OF THE SNAKE RIVER (IDHS 1978)

Site	River Mile	Pollutant Loading and Sources		Pollutants
		Major	Minor	
Below Milner (into ES reach)	638.7	Point Sources	Rupert Burley J.R. Simplot (Burley) Ore-Ida Foods	Suspended solids BOD Nutrients Bacteria
		Non-Point Sources	Irrigation return flows Urban runoff Livestock grazing & feeding	Sediment Turbidity Nutrients Bacteria
King Hill (ES reach)	546.6	Point Sources	Jerome Twin Falls	Suspended solids BOD Nutrients Bacteria
		Non-Point Sources	Irrigation return flows Hydrologic modification Livestock grazing & feeding	Sediment Turbidity Nutrients Bacteria
Marsing (ES reach)	424.0	Point Sources	None	Suspended solids BOD Nutrients Bacteria
		Non-Point Sources	Irrigation return flows Livestock grazing & feeding Dryland farming	Sediment Turbidity Dissolved salts Temperature Nutrients Bacteria
Nyssa (below ES reach)	389.0	Point Sources	None	BOD Suspended solids Nutrients Bacteria
		Non-Point Sources	Irrigation return flows Possible Oregon sources Livestock grazing & feeding	Sediment Turbidity BOD Temperature Nutrients Bacteria

Snake River especially along tributaries below the ES area, where over 750,000 cattle are grazed annually (PNRBC 1970). These animals cause pollution loadings equivalent to wastes from 250,000 humans. Animal-caused streambank erosion along feeder streams is an important source of soil losses. The very high coliform bacteria levels in the Snake River below the ES area are attributed to a large extent to livestock use.

Temperature: The Snake River flowing into the ES area is considerably warmed in winter and cooled in summer by the discharge of one Snake River aquifer at Thousand Springs (RM572). Mean water temperatures for the Snake River in winter and summer conditions reflect this effect of the aquifer discharges to the river (Figure 2-4). Only a modest amount of icing occurs in the ES reach because of the high inflow rates from groundwater sources.

In June and July the average monthly water temperature at King Hill (RM546) is 18.5°C. In 1977 the maximum reached 24.5°C at Swan Falls (RM457.7); Swan Falls discharge exceeded 21°C for 14 consecutive weeks. In 1976, temperature at Swan Falls exceeded 21°C for 11 weeks, and for 9 weeks in 1978. The 21°C level is important in determining initiation of blue-green algal blooms and also delineates the upper temperature limit of active trout and white fish communities. Fish diseases can be stimulated when temperatures reach the maximum tolerated by a given species.

Idaho State Water Quality Standards for water temperature (18.8°C for Class A primary contact recreational waters) are consistently exceeded in the ES area of the Snake River during the summer months. (The Water Quality Standard is the point beyond which unnatural heat inputs cannot be permitted to increase stream temperature).

Downstream from Buhl (RM581), the combination of reservoirs, surface heating, and tributaries in the downstream 160 miles raise the average summer temperature about 1°C (EPA 1978a). Tributaries have a minor role in warming the Snake River because of their small flows and summer temperatures averaging only 20 to 21°C (EPA 1978b). Surface heating is by far the major source of summer heat gain to the Snake River in the ES area overriding even the large, cool discharges from the Snake River aquifer at Thousands Springs. Therefore, summer temperatures in excess of 18.8°C are a natural phenomenon between Salmon Falls Creek (RM 586.5) and Marsing (RM 424.0).

Turbidity: Stream turbidity (suspended sediments, algae, and organic debris) of the Snake River increase markedly from Burley (RM 653.7) to Weiser (RM 351.3) (see Figure 2-5). Upstream of the ES area (RM 654) mean annual turbidity values are around 7.5 Jackson Turbidity Units (JTU). (At 30 JTU visibility in the river would be about 20 cm.). In the 70 miles below Burley, the river receives large volumes of turbid water from surface gravity irrigation returns.

At Buhl the river turbidity has a mean of 28.5 JTU (EPA 1978) largely a result of irrigation returns from gravity irrigation. For example, the

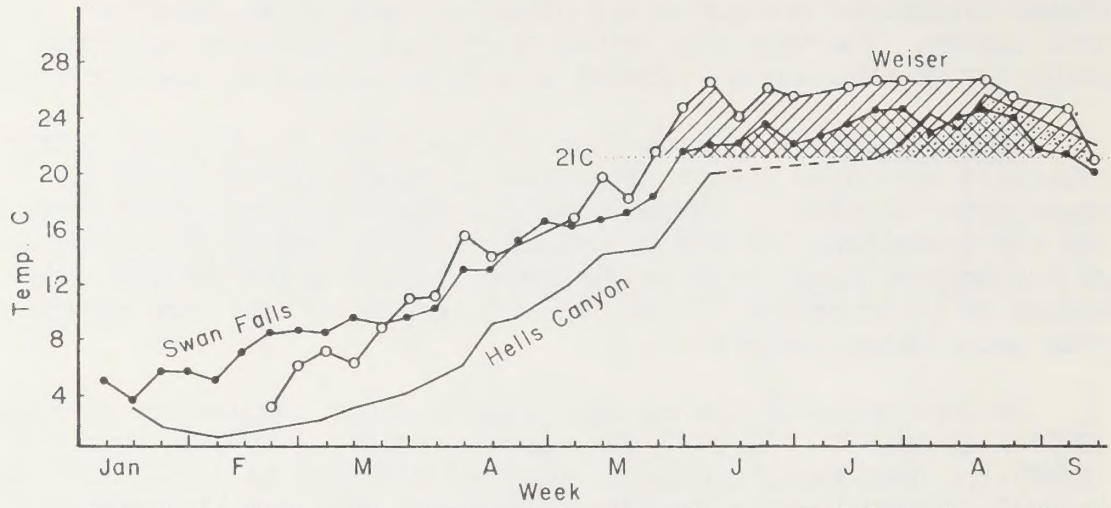


FIGURE 2-4. Snake River water temperatures from winter through early fall at selected points in and below the ES area. Shaded areas indicate periods in which water temperatures exceed 21° C, the threshold which often triggers blooms of blue-green algae and is an upper level for viable trout and whitefish populations.

SOURCE: EPA 1979a.

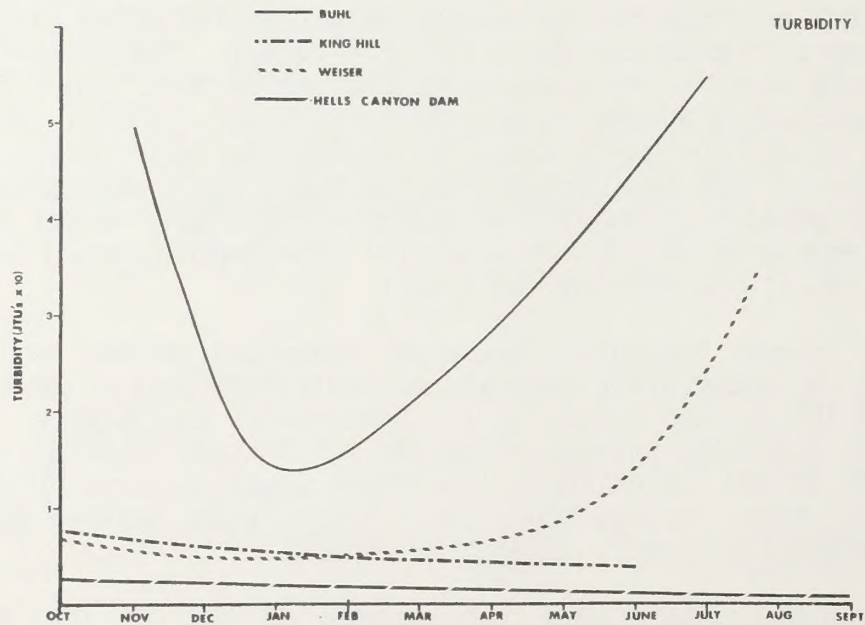


FIGURE 2-5. Turbidity of the Snake River at selected locations by month for 1977.

SOURCE: IDWH 1978.

Twin Falls tract delivers about 414 pounds of sediment per acre per year (Brown et al 1974) in extremely turbid return flows (14 percent of water applied in this tract returns as surface flow).

After the large inflow from Thousand Springs (RM 572) enters the small volume of turbid water in the main Snake, turbidity is reduced to a mean annual level of 6 JTU. By Marsing (RM 424), turbidity reaches a mean of 8 JTU (IDHW) as surface irrigation returns add more suspended solids than settle out in the reach. By Nyssa (RM 389), irrigation increases turbidity to 10 JTU. Algae also contribute to turbidity in this reach (EPA) 1974.

In the Idaho Power dam complex below Weiser (RM 351), settling reduces turbidity to a mean of 3 JTU below Hells Canyon Dam (RM 247).

Idaho Water Quality Standards cite 5 JTU as the limit beyond which man caused inputs should not cause additional turbidity (IDECS 1973). Present upstream irrigation return flows clearly cause the ES reach of the Snake River to exceed this standard for most of the year. The high summer turbidity in the Buhl reach and below Marsing is probably the major factor limiting aquatic plant growth through the summer and fall. In the middle reach (King Hill to Marsing) turbidity also limits plant abundance but not to the marked or continuous extent of the more turbid areas.

Sedimentation: Fine sediments now predominate stream bottom coverage in several areas through the ES area (Falter 1978...personal observation and Sigler et al 1972). Free-flowing stretches are partially scoured in each high-flow period, but the reservoir areas (C.J. Strike, Swan Falls) continue to accrue sediments even at high flow.

pH: Downstream through the ES area pH (an indicator of hydrogen ion concentration) increases from 7.2 to 8.9 (IDWH 1978). Lower values are in the upstream reaches while the range increases downstream. From Marsing downstream to Weiser, summer pH often attains 8.9, reflecting both increased algal production and increased bicarbonate in the Snake River. Since Idaho Water Quality Standards specify an allowable range of 6.5 to 9.0 pH levels are within the allowable limits.

Conductivity: Electrical conductivity (a reliable estimate of dissolved substances) averages about 450 unhos through the upstream end of the ES area (see Figure 2-6). There is very little change until Marsing, where conductivity rises about 10 percent. Below Marsing, large tributaries of low conductivity, as well as nutrient entrapment by Idaho Power Company (IPC) reservoirs, combine to return conductivity to 450 unhos below Hells Canyon Dam.

Nutrients: Nutrient content of the upper Snake River rises rapidly as the river flows over the upper Snake River plain. The key nutrients-nitrates NO_3 and phosphorus PO_4^- indicate the algal growth potential of water since one or both of these nutrients is/are most often limiting to algal growth at any one time if adequate light is available (EPA 1974a).

At Buhl and King Hill both NO_3 and total PO_4 are very high the entire year, usually over the 0.30 and 0.05 mg/liter concentrations respectively, which are considered as the threshold concentrations for algae blooms (see Figures 2-7 and 2-8).

Nutrient levels consistently exceed bloom-threshold concentrations in the Bruneau River as well as in the small tributaries and irrigation return flows (IDWH 1978 and EPA 1978b). As a result, the Snake River below Salmon Falls Creek (RM 586.5) to Brownlee Reservoir has sustained high nutrient levels.

Most of the phosphorus leaving irrigated land is associated with sediment (Carter et al 1971 and 1974). Surface flows of irrigation return water deliver high phosphorus loading in the stream while groundwater returns are quite low in phosphorus. Nitrogen is commonly the other major aquatic plant growth-limiting nutrient throughout the Snake River, but the abundance of nitrogen-fixing blue-green algae genera with their associated nitrogen-fixing bacteria in the Snake River blooms through the ES area (EPA 1973 and FWPCA 1970) ensures higher late summer nitrogen supplies. Phosphorus is considered to be the principal algal growth-limiting nutrient for most of the summer and fall (IDHW 1978, EPA 1974b, and EPA 1975).

Irrigation water flowing over and through soil tends to increase its load of nitrate through solution, unlike its phosphorus load which is lost to the soil through absorption and precipitation. Carter et al (1971) demonstrated a 1540 percent increase in nitrate to a mean of 3.1 mg/liter in subsurface runoff water (compared to applied water) while there was insignificant concentration change in nitrate in surface runoff. The maximum NO_3 concentration established in Idaho drinking water standards is 10.0 mg/liter (nitrate nitrogen), in order to prevent methemoglobinemia (a blood anemia) in infants (IDHW 1977).

Bottom organisms: Total live weight (per unit area) of bottom invertebrates such as water insects, clams and crayfish in the ES area of the Snake River is high in polluted reaches and low in clean-water areas. The composition shifts from a high proportion of forms preferred by game fish in the cleaner upper end of the ES area to a low percentage of preferred forms in the more polluted reach below the ES area (Falter et al 1976 and EPA 1973b). Appendix 2-5 lists invertebrate groups found in the Snake River.

Bacteria: All surface waters contain many types of bacteria not dangerous to man. No studies of these organisms are available in the ES reach. Below the ES area, the only non-pathogenic (not disease associated) organisms worth special mention is Sphaerotilus, a colorless filamentous bacterium. It is abundant on the stream bottom and on debris below heavy inflows of organic pollution, such as below the Malheur and Boise Rivers (EPA 1973a). Sphaerotilus filaments may cause problems in fouling water intake screens or grates and in secondary treatment of domestic water. However this bacterium is not a serious problem in the area.

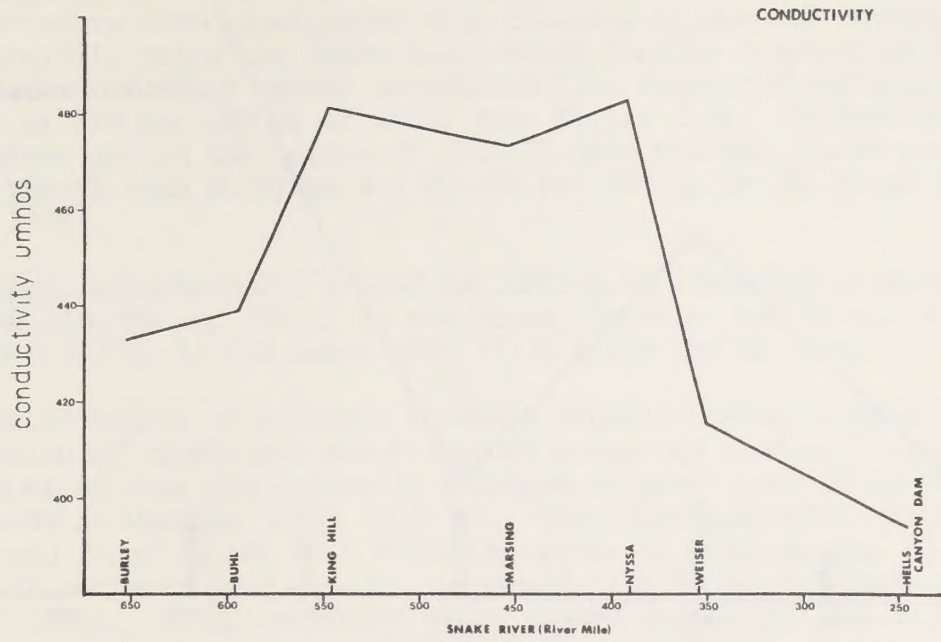


FIGURE 2-6. Water conductivities at selected points in and below the ES area by month in 1977.

SOURCE: IDHW 1978.

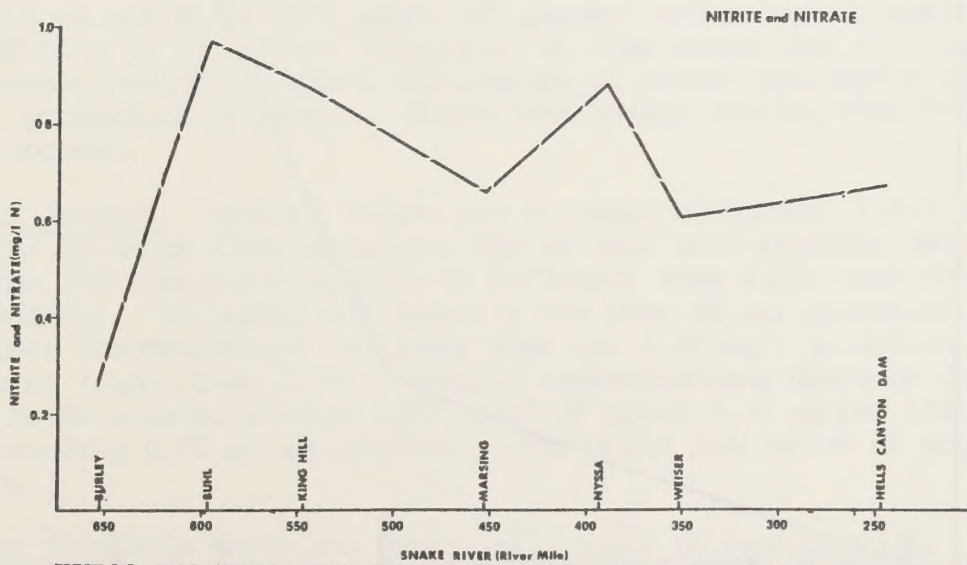


FIGURE 2-7. Total nitrate and nitrite nitrogen at selected points on the Snake River in the ES area, means for 4 years.

SOURCE: IDHW 1978.

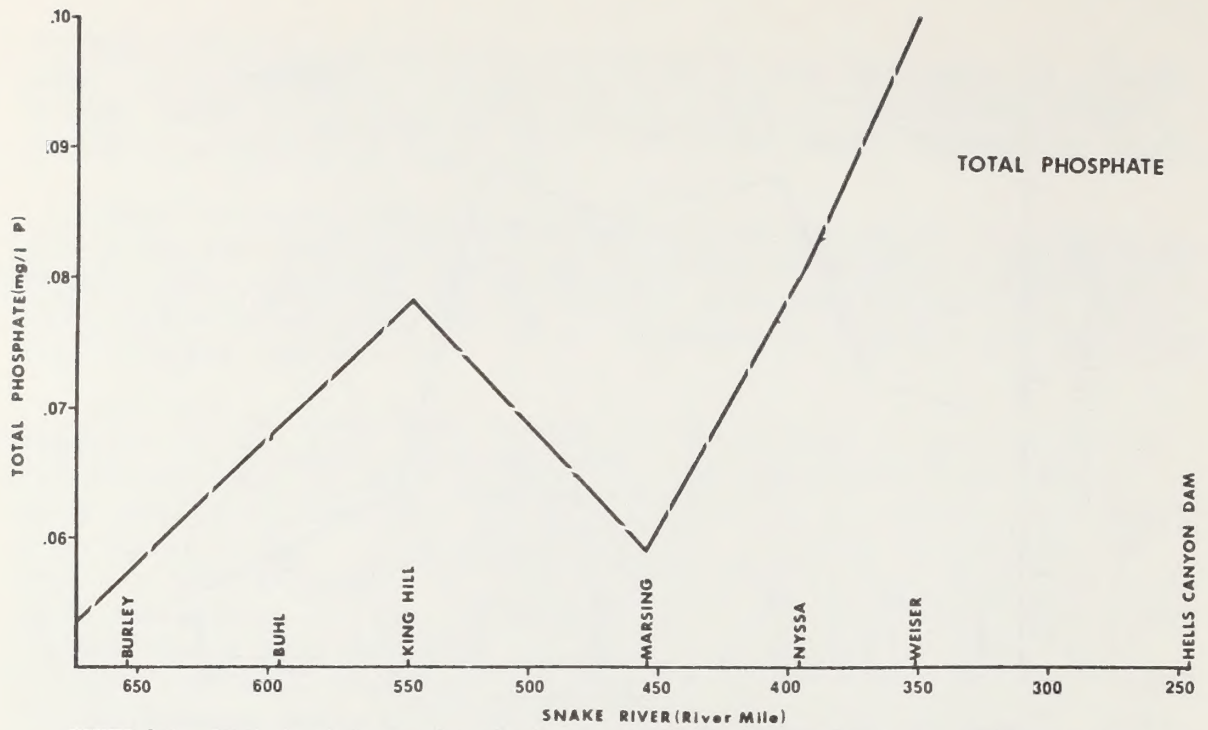


FIGURE 2-8. Total phosphate at selected points on the Snake River in the ES area, means for 4 years. SOURCE: IDHW 1978.

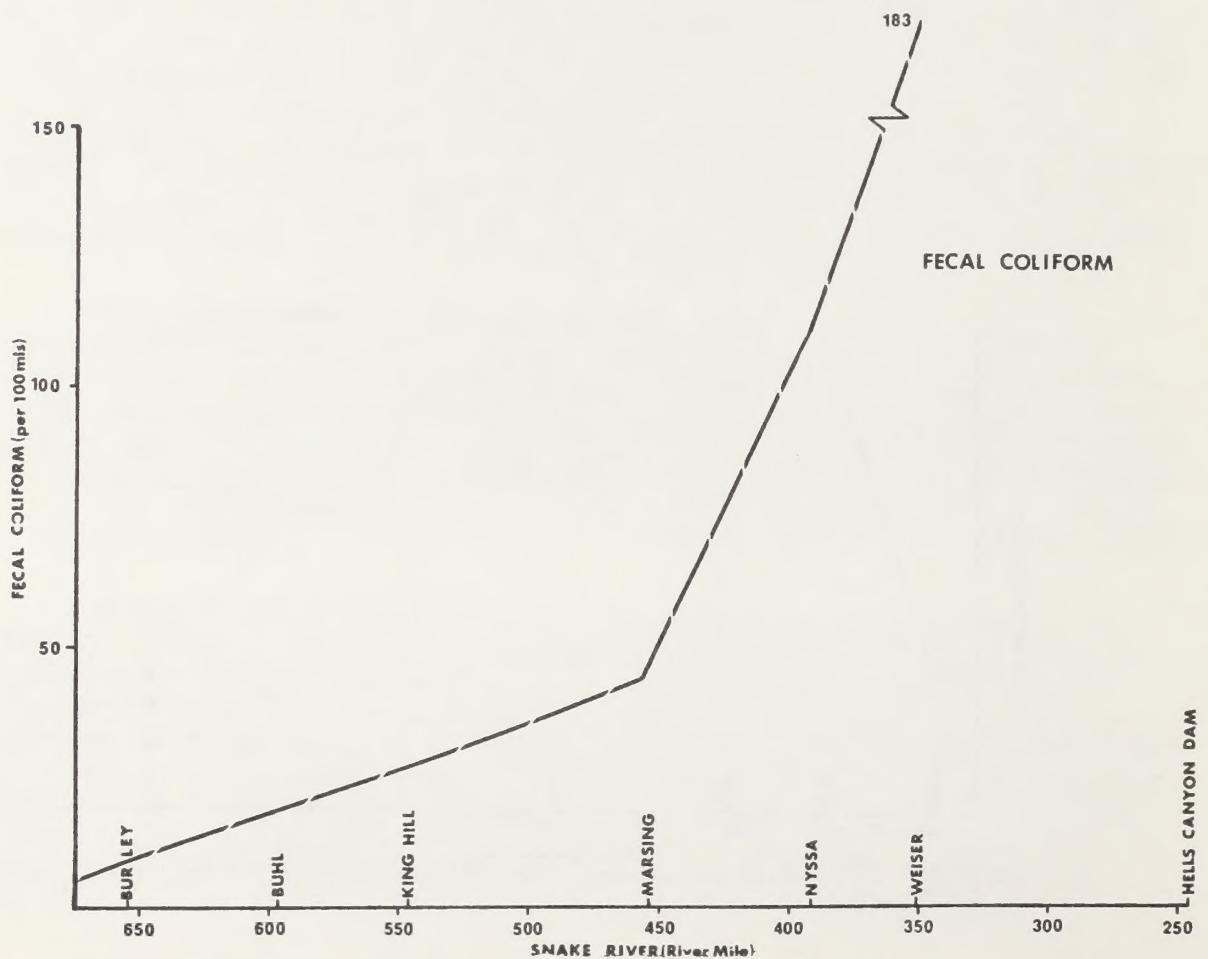


FIGURE 2-9. Average Annual Fecal Coliform Densities in the ES Reach of the Snake River.

Average fecal coliform bacteria (bacteria of mammalian fecal origin and therefore often associated with diseases of man and domestic animals) are generally below the Idaho State Water Quality Standard of 50 per 100 milliliters of water except downstream from Marsing where they may reach a mean of 183 per 100 ml of water (see Figure 2-9). Individual samples on a given day in the period of 1974-77 have reached 10,000 per 100 ml below the ES area at Nyssa and 20,000 per 100 ml in the lower Boise River (IDHW 1978).

Fecal streptococci, a good indication of livestock pollution, have reached 110,000 per 100 ml in the Boise, Payette, and Weiser rivers; and 7700 per 100 ml in the Snake (EPA 1972) below the ES area.

Total counts of coliform bacteria (mostly non-pathogenic but an indication of conditions which support dangerous bacteria) are high in the upper ES area and gradually decrease to just under Idaho water quality standards at Marsing (USGS 1965-76). Very high bacterial concentrations have been found in the Twin Falls-Burley area, with sewage, livestock, and soil bacteria from heavily irrigated farm areas all contributing (PNRBC 1970). Total coliforms often exceed 10,000 per 100 ml of water, and no declines occurred 1970 to 1976, even as point sources were treated. Continuing high coliform concentrations suggest the increasing importance of non-point sources to bacterial loading.

Oxygen: Even after biochemical oxygen demand (a measure of oxygen needed to oxidize organic materials in water) is diluted in the Thousand Springs area, it remains high. This is a residual effect of point and non-point pollution loadings above the ES area. Algal activity is largely responsible for the high biochemical oxygen demand (BOD) from King Hill downstream to the major tributaries.

Oxygen is not a factor which limits aquatic life from the upper ES area of the Snake River down to Marsing. Below Marsing, daytime oxygen concentrations are still well above 100 percent saturation in early summer but drop to 90 percent saturation in late summer and fall as the organic-waste loading and plant utilization of oxygen overshadow photosynthetic production of oxygen. Night-time levels decline even further below 90 percent.

Total Ammonia: Ammonia (which may be toxic to aquatic life) concentrations in Snake River waters of the ES area have steadily decreased through the 1970s as point sources of pollution come under some form of waste treatment. At nearly all times of the year at all points of concern ammonia concentrations are lower than the 0.20 mg/l guideline set by the State of Idaho (IDHW 1978). Ammonia concentrations decrease downstream through the ES area to average 1977 level of about 0.05 mg per liter. Levels exceeding 0.20 mg are generally considered indicative of organic pollution.

Other Chemicals which are potentially toxic to aquatic life: The IDHW has determined arsenic, cadmium, chromium, cobalt, lead, manganese, and zinc to be below the maximum permissible 20 mg per liter limit in 1976 and 1977 (IDHW 1978).

There is mounting evidence of increasing pesticide concentrations in waters draining major agricultural areas (PNRBC 1970). Water samples may show very low pesticide levels but aquatic organisms can concentrate these toxicants in their tissues. Pesticides data are scanty in the ES area of the Snake River. Appendix 2-6 lists concentrations in water and sediment in Milner Pool above the ES area from 1970 to 1973 (US BOR 1978). Concentrations are low in the water sample, but certain pesticide components show high concentrations in the sediments (chlordane, toxaphene, and the PCB AroChlor). Organic pesticides tend to be bound onto sediments, or in the water column. The highest pesticide concentrations in the ES area are in the upstream ends of reservoirs and in stream reaches which receive large irrigation surface-return flows. Subsurface return flows have effectively been cleansed of sediments, heavy metals, and pesticides.

Herbicides as a group are comparatively short-lived in soils and can be expected to behave as pesticides, binding with soil particles. No data on herbicide levels are available in the ES area.

Tributaries

Of the 20 more important tributaries which drain into the Snake River from the ES area, six have a high percentage of their watersheds within ES land with high farm development potential (Pilgrim Gulch - RM 556; Roosevear Gulch - RM 539; Deadman Creek - RM 537; Saylor Creek - RM 528; Alkali Creek - RM 535; and Cold Springs Creek - RM 531). Based on data from a similar stream (Big Jacks Creek, a Bruneau River tributary), it can be stated that peak flows in tributaries usually occur in March and minimum flows in late fall and winter. Big Jacks Creek, one of the larger tributaries, often stops flowing in late summer (USGS 1975-76). Most of the tributary streams are smaller than Big Jacks Creek and cease flowing for a time each year.

Mean summer water quality in Little Valley Creek (a Bruneau River tributary), and a stream similar to the six named above, was 20.9°C, 2125 umhos conductivity, 29 JTU turbidity (range 2.7 to 90, or from clear to muddy brown), 1.2 mg/liter nitrate, 1.12 mg/liter total phosphate, and less than 0.01 mg/liter ammonia.

All six of these tributaries are typical desert streams with moderate temperatures (upper end of preferred trout temperatures and similar to the Snake River in the ES area), high conductivity, flashy runoff, and highly variable nitrates and phosphates. The only water quality information available on these streams is a small amount of temperature and chemical data collected by EPA (1978b) from the stream mouths and some unpublished data from the BLM, Boise Office in 1978.

Samples of bottom invertebrates in tributary streams in the ES area indicate a species diversity similar to that in the main Snake (Falter et al 1976) but without the extreme low diversity of organically-polluted sites. Cleanwater forms tend to be more abundant in tributaries.

Groundwater

Discussion of groundwater will be limited to the Bruneau - Murphy area since this is the area of groundwater availability and would provide irrigation water under the proposed action.

Groundwater is generally of a sodium bicarbonate type in the Bruneau-Murphy, (Streams et al 1938). Water from sedimentary-rock aquifers is generally high in dissolved solids (greater than 600 mg/liter), nearly neutral in pH, and low in fluoride. Water from volcanic aquifers generally is lower in dissolved solids (less than 500 mg/liter), higher in pH (over 8.0), and higher in fluoride (over 8 mg/liter). Chloride concentrations are usually lower than 75 mg/liter in water from volcanic aquifers and are usually less than 20 mg/liter in water from sedimentary aquifers. Sulfate concentrations are higher in volcanic aquifers than in the overlying sedimentary aquifers.

In the Bruneau-Murphy area groundwater temperatures at the surface range from 9.5° to 83.0°C. Temperatures are higher in water from the deeper volcanic aquifers (40°-83°C) than in the sedimentary aquifers (less than 35°C).

Temperature and dissolved solids can cause problems for irrigators. Hot water has to be cooled, usually in ponds, before it can be applied to crops. High sodium and fluoride levels cause buildup of these minerals in the soil, reducing crop production.

Surface Water Downriver from the ES Area

The reach from Marsing to Brownlee Reservoir below the ES area has settling and floating solids with high bacterial contamination and noxious algal growths (IDWRB 1972). The Boise River contributes 64 percent of the total load of point source biological oxygen demand, and the mainstem Snake contributes 27 percent (EPA 1975). Of the total input of suspended solids from point sources to the main Snake, tributaries (largely lower tributaries) contribute 91 percent and the mainstem accounts for 9 percent of the point-source loading.

Non-point source loading is mostly from irrigation return flows above and below the ES area. The Boise River carries the highest nutrient and suspended sediment loads from irrigation. The Malheur and Owyhee Rivers deliver lower irrigation loadings to the Snake, but are of low water quality. The Twin Falls tract also delivers heavy irrigation loading.

Summer mean temperatures average 21.3° C at Weiser, which is about 3°C higher than the upstream ES area water temperatures. This is significant because 21°C is the uppermost temperature limit of active trout and also is an approximate threshold above which noxious blue-green alga blooms become more common. Summer water temperature below Brownlee Reservoir is 6°C lower than above.

Turbidity increases to 12 JTU at Weiser from 8 JTU at the lower ES area (IDHW 1978). Irrigation surface return flows are the major source of turbidity. Very high algae concentrations also contribute to turbidity of this reach. As the Snake River flows through Brownlee, Oxbow, and Hells Canyon Reservoirs, most of the inorganic sediments settle out, lowering the average turbidity to 3 JTU (nearly clear) at Hells Canyon.

As in the ES area, fine sediments predominate in bottom coverage to Brownlee Pool (Falter 1978 and Sigler et al 1972). Brownlee reservoir, a giant settling pool, accrues sediments even at high river flows.

Below the ES area to Weiser, summer pH often attains 8.9, reflecting the increased bicarbonate concentration and algae production in this area of the Snake River as compared to the ES reach.

Conductivity remains near a year-round average of 500 umhos from the lower ES area (Marsing) into Brownlee pool; the irrigation return flow contributions and high conductivity rivers (Owyhee, Malheur and Boise) are offset by the inflowing streams (Payette and Weiser) with relatively lower dissolved solids concentrations. Passage through Brownlee and Hells Canyon reservoirs reduces the dissolved solid concentration about 10 percent so that conductivity at Hells Canyon annually averages about 450 umhos.

Nutrient levels consistently exceed threshold concentrations for algal blooms in the Boise, Malheur, Payette, Owyhee, and Weiser Rivers downstream from the ES area. The decline of total phosphorus at Weiser results from removal from the river by algae uptake during the summer months.

After the Snake River has passed through Brownlee, Oxbow and Hells Canyon reservoirs, mean total phosphate concentrations are at or below the 0.05 mg/liter threshold level for algae blooms, a major reduction from Weiser. Levels of nitrate below the reservoirs remain similar to those above the reservoir.

Below the ES area to Brownlee, daytime oxygen concentrations are well above 100 percent saturation in early summer. This drops to below 90 percent saturation in late summer and fall due to increased organic waste loading and algae respiration. In Brownlee Reservoir, near-surface oxygen concentrations continue to fluctuate from the addition of photosynthetic oxygen in the daytime and nighttime respiratory consumption. It appears, however, that only species with high oxygen requirements are limited. On the other hand, deepwater below the metalimnion in Brownlee Reservoir suffers oxygen depletion nearly to zero by late summer (EPA 1978c).

Ammonia concentrations in the downriver reach below the ES area lower than the 0.30 mg/liter State Standard. Heavy or trace metals in the river reach have been within safe limits in recent years.

Samples at Nyssa (1975-77), below the ES area, indicate an accumulation of DDT and DDT derivatives, aldrin, chlordane, dieldrin, ethion, and malathion in the water. It is likely that pesticides adsorbing to the sediments accumulate at Brownlee reservoir.

Levels of some bacteria of public health significance consistently exceed Class A2 water (recreational primary contact use) State Standards of 50 organisms per ml in the river reach below the ES area. Levels have reached as high as 74,000 organisms per ml for fecal streptococci in 1971. The Boise River has delivered a large percentage of this bacterial loading to the mainstem of the Snake River. Pathogenic (disease associated) species of the bacterium Salmonella were also isolated from this river reach in 1971.

Benthic invertebrate biomass increases downstream through the ES area, from upstream lows to high biomass at Weiser. Composition shifts from high percentages of preferred forms for game fish in the upper end to low percentages of preferred forms in the polluted lower reach. Availability of clean, washed substrate is probably the major limiting factor for the "clean" or "preferred" fauna (Falter et al 1978).

VEGETATION

Terrestrial

The ES area falls within the sagebrush/grass and salt-desert shrub/grass ecosystems, with a precipitation range of 8 to 10 inches. Early records indicate that much of the area was once covered with lush bunchgrasses (including Thurber's needlegrass, Idaho Fescue, and bluebunch wheatgrass) and some sagebrush and winterfat. Heavy grazing by livestock, especially during the spring period, and indiscriminate use of fire to remove old growth led to the establishment of the present vegetation cover. This present cover consists mainly of big sagebrush and cheatgrass, the latter invading many of the overgrazed ranges before 1910. A salt-desert shrub vegetation type occurs on heavier soils and on soils having a high salt content, with shads hale, greasewood, and cheatgrass being the most predominant species. Overall, current vegetation is in relatively poor condition.

Areas where the natural vegetation cover has been destroyed by fire or overgrazing have often been reseeded with crested wheatgrass in an effort to quickly establish a perennial vegetative cover. Attempts to improve wildlife habitat by seeding browse species have been limited. However, recent browse species seedings in the Saylor Creek planning unit have been encouraging.

The 439,303 acres of public land within the ES area include approximately 275,583 acres of sagebrush/grassland, 87,085 acres of seeded grassland, 42,810 acres of salt-desert shrub/grassland, and 33,825 acres of natural grassland. Map 2-5 shows these general vegetation types. Grasses and shrubs most commonly found throughout the ES area are listed in Table 2-6. A complete list of plant species found within the ES area is on file at the Boise District BIM office.

TABLE 2-6
GRASSES AND SHRUBS MOST COMMONLY FOUND
THROUGHOUT THE ES AREA

<u>GRASSES</u>	<u>SHRUBS</u>
bluebunch wheatgrass (<u>Agropyron spicatum</u>)	big sagebrush (<u>Artemisia tridentata</u> , subspp.)
cheatgrass (<u>Bromus tectorum</u>)	bud sage (<u>Artemisia spinescens</u>)
crested wheatgrass (<u>Agropyron cristatum</u>)	greasewood (<u>Sarcobatus vermiculatus</u>)
Idaho fescue (<u>Festuca idahoensis</u>)	rabbitbrush (<u>Chrysothamnus</u> , spp.)
Indian ricegrass (<u>Oryzopsis hymenoides</u>)	shadscale (<u>Atriplex confertifolia</u>)
needle-and-thread grass (<u>Stipa comata</u>)	spiney hopsage (<u>Grayia spinosa</u>)
Sandberg's bluegrass (<u>Poa sandbergii</u>)	
squirreltail (<u>Sitanion hystrix</u>)	
SOURCE: BLM Planning Documents and Range Surveys, 1960-1978.	

Riparian

Riparian or streamside vegetation varies considerably depending on whether annual flooding occurs or whether streams are normally confined to their banks. Where flooding occurs, important species may be red alder, black cottonwood, aspen, and willow.

Condition of the riparian vegetation will vary with the use of adjacent land. There is a tendency in heavy agricultural areas to eliminate vegetation along ditches and some stream banks as part of clean farming practices. Riparian vegetation provides cover for wildlife and stream protection for fish and aquatic organisms. There are approximately 55 miles of riparian vegetation on public land within the ES area. (Refer to Map 2-5).

Aquatic

Phytoplankton (Free-Drifting Single-Celled or Colonial Algae)

The ES reach of the Snake River supports heavy concentrations of this aquatic growth, which can be considered an effect of water pollution in part. This growth also partly controls other pollution parameters such as biochemical oxygen demand (BOD is the amount of oxygen required to oxidize the organic matter in a given amount of water). Phytoplankton

TABLE 2-7
 CURRENT STATUS, AREA SIZE, AND DENSITY OF
 THREATENED AND ENDANGERED PLANTS WITHIN THE ES AREA

Scientific Name	Common Name	total area of sites	Approximate density 1/	Current Status
<u>Astragalus camptapus</u>	Murphy milkvetch	8300 acres	moderately dense	candidate for Idaho's Endangered list. May be proposed to the Federal Register of Endangered Plants.
<u>Eriogonum shockleyi</u>	cow pie eriogonum	1.2 acres	sparce	same as above
<u>Astragalus atratus</u>	mourning milkvetch	170 acres	sparce	candidate for Idaho's Threatened list
<u>Astragalus calycosus</u>	matted milkvetch	600 acres	sparce	same as above
<u>Gymnosteris nudicalis</u>	large flowered gymnosteris	40 acres	sparce	same as above

1/ density values are:
 sparce=less than 10 plants per acre
 moderately dense=between 10-100 plants per acre
 dense=more than 100 plants per acre

SOURCE: Threatened and Endangered Plant Inventory and Study, 1978, BIM



Riparian



Grassland



Sagebrush/Grass

FIGURE 2-10. Vegetation types in the ES area.

is the main source of BOD in the lower ES area and below, far outranking all other BOD contribution. Diversity of algae tends to be high in the high-nutrient reaches, but decreases where nutrients are below bloom thresholds. Phytoplankton composition is dominated by diatoms year-round in the ES area (USGS 1965-1976). Blue-green algae are present as short-lived blooms in late summer. The more polluted reaches below Marsing have a higher incidence of blue-green algae (USGS 1965-76).

Attached Benthic Algae (Single-Celled or Colonial Algae Attached to the Stream Bottom)

As with the floating planktonic algae, benthic algae reach highest stock levels in the ES area in the more polluted areas below Marsing. Distribution of benthic algae depends on presence of a suitable substrate, and sediments are not suitable except in still water. Because the stream bottom in the ES area is covered by sediments in many areas, the habitat for benthic algae is limited. Riffles, submerged debris, rooted aquatic plant surfaces, and bare rocks in the more-rapidly flowing sections are the best habitat areas for benthic algae.

Rooted Aquatic Plants (Multi-celled Plants with Stems and Leaves)

The ES reach of the Snake River is not choice habitat for rooted aquatic plants. Light availability seems to be the limiting factor. Water-level fluctuations may also limit rooted aquatic plants in reaches below Milner Dam, in Strike Pool, in Swan Falls Pool, and below the latter two dams.

A few isolated areas of rooted aquatic plant development are found in the ES area of the Snake River. They include the Thousand Springs area where the large inputs of clear water reduce turbidity enough for thick rooted aquatic plant beds to develop across the width of the Snake River on riffle areas; the head of C.J. Strike Pool where plants grow as patchy clumps across the river in the upper 2 to 3 miles of the pool (further into the C.J. Strike Pool, rooted aquatic plants grow only in a shore zone up to 30 feet in width (Falter et al 1974); and slow-moving reaches such as the Swan Falls Pool where emergent aquatic plants dominate.

Threatened and Endangered Plants

During the spring and summer of 1978, an extensive vegetation inventory for plants classified as threatened or endangered was conducted in the ES area. From this inventory and consultation with local plant specialists on the Rare and Endangered Plants Technical Committee of Idaho, two plants within the ES area have been tentatively classified as endangered and three have been tentatively classified as threatened. All five are proposed as candidates to Idaho's Endangered and Threatened list. None are currently on any federal status lists.

Map 2-5 shows the approximate locations of these plants. Table 2-7 lists the five plants and shows their current status. The table also

shows the approximate total area size for all known sites within the ES area and approximate density.

Complete reports as well as dried specimens of these plants are on file at the BLM Boise District office.

WILDLIFE

Terrestrial

Reproduction and feeding are the functions most critical to the existence of a wildlife species. For this reason, wildlife species in the ES area have been categorized into specific groups based on a combination of their requirements for reproduction sites and feeding habitat. This unique combination for an animal is referred to as its "life form." All terrestrial animals which breed in the ES area have been assigned to the life form which most closely depicts their reproductive and feeding habitat requirement in this area (see Appendix 2-7). Not only are these life forms useful in that they show the basic needs of each animal, they will also be used to aid in the assessment of impacts as a result of the proposed action. Species lists include season of use, relative abundance, and habitat preference (see Appendix 2-7).

Within each particular life form there may be a number of vegetation types resulting from differing site conditions and successional stages. This diversity of habitat is directly related to the abundance and variety of species found in a given life form.

There are five basic habitat types within the ES area. These habitat types include the shrub/grassland type, grassland type, rocky cliffs and canyons, wetlands (riparian and marshes), and agricultural land. Each of these habitat types is important to particular groups of animals and will be discussed in greater detail in the following section.

Mammals

Big Game:

Mule Deer: Mule Deer are native to southwestern Idaho. The most significant population of Mule Deer occurring in the ES area occupies a winter range which falls partially within the ES boundaries. This important winter range is located in the Bennett Mountain foothills and along the King Hill Creek drainage (see Map 2-6). The approximate acreage of this range which lies within the ES area is 14,800 acres. An estimated 500 mule deer use this area from November through March (Idaho Fish and Game).

Shrubs are the dominant vegetative structure and provide critical cover on this winter range. In the spring, grasses provide an important portion of the mule deer diet.

In addition to the migratory deer herd on the winter range, small scattered year long populations of mule deer occur throughout the ES area. It is estimated that these populations total between 100 to 150 deer. These deer are most often associated with riparian vegetation and are found along rivers, creeks, and drainages (such as the Snake River, Bruneau River, Reynolds Creek, and Salmon Falls Creek) and on islands in the Snake River. Deer are also seen in the shrub/grassland habitat type and are occasionally observed near agricultural land where cover exists. Shrubs are the dominant vegetative structure and are used for food and cover by these animals. Other vegetation species provide food during certain seasons.

Pronghorn: Pronghorn are native to southwestern Idaho, but their occurrence in the ES area is relatively limited. Three antelope ranges border the area and, to a limited extent, overlap the area. A major range lies in the foothills of the Owyhee Mountains to the south and southwest. These pronghorn areas are shown on Map 2-6.

Approximately 35 to 40 antelope inhabit area "A" (as shown on Map 2-6) year long. Only about 800 acres of this range fall within the ES area. Approximately 40 animals are year long residents in area "B", which borders the ES area. Area "C" is an antelope winter range which supports approximately 200 to 250 pronghorns (Idaho Fish and Game, U.S. Fish and Wildlife Service). A small percentage, approximately 10,250 acres, of this range falls within the ES area. The Dove Springs area, area "D", has been reported as being inhabited by approximately 30 to 35 pronghorns (Idaho Fish and Game). In 1976 this area was exposed to an extensive range fire, and a large crested wheatgrass seeding was established. This may have displaced some of the antelope that originally occupied the area.

Perhaps because of the small acreages of antelope range located in the ES area, no critical breeding or foraging areas have been identified.

Small Game:

Mountain Cottontail and Pygmy Rabbit: The mountain cottontail (Sylvilagus nuttalli) and pygmy rabbit (Sylvilagus idahoensis) are both native to southwestern Idaho and are classified as game animals in Idaho. The mountain cottontail is found throughout the ES area where suitable habitat exists. The pygmy rabbit is primarily restricted to dense stands of big sagebrush and occurs in relatively low numbers.

Snake River Birds of Prey study personnel found that riparian, tallus, and greasewood areas supported the highest numbers of mountain cottontails. Specifically, riparian habitat accounts for approximately 50 percent, talus 40 percent, greasewood 5 percent, and other areas 5 percent of cottontails caught in their studies. Mountain cottontails are seen in agricultural areas where suitable adjacent cover exists.

Predators and Furbearers: Furbearers found in suitable habitat in the ES area include the longtail weasel, shorttail weasel, mink, red fox,

beaver, and muskrat. Populations of these species are limited within the ES area. They are primarily associated with riparian habitat and no population data has been collected. The river otter and bobcat are furbearers but are also classified as sensitive species and will be discussed in the section dealing with sensitive species.

Predatory mammals include striped and spotted skunk and the coyote. The coyote is quite common throughout the ES area. Although it chiefly occurs in the shrub/grassland habitat type, it is quite adaptable and can be seen in many habitats including the agricultural lands.

Non-game:

Non-game mammals provide a significant prey base for raptorial birds and other predatory animals. Their composition and numbers have a direct relationship to the numbers and types of predatory species which occur in a given area. All non-game mammals found in the ES area are listed in Appendix 2-7. It was not possible to rate relative abundance for all species. However, life forms are developed for all 37 non-game mammals which occur in the ES area. A number of these, including the Great Basin kangaroo rat, sagebrush vole, and whitetail antelope squirrel, are primarily dependent upon the shrub/grassland habitat type, which is so dominant in the ES area.

Upland Game Birds:

California Quail: California quail occur in scattered populations throughout the ES area. Numbers vary according to habitat type. California quail are most abundant in riparian habitats, particularly those adjacent to irrigated agriculture. Free water is important to these birds during the warm months when succulent plant species are not available. For this reason, river valleys and creeks throughout the ES area, as well as the Snake River islands, are concentration areas for California quail. Agricultural areas in the vicinity of Marsing and Oreana have large populations of quail. This is also true of the Castle Creek drainage and Bruneau River Valley where creeks and surface irrigation have allowed establishment of riparian vegetation.

In contrast, the large agricultural developments in the Saylor Creek, Grindstone Butte, Bell Rapids and Blue Gulch areas have low numbers of quail. Little adequate habitat exists in conjunction with these large sprinkler irrigated farms.

Bobwhite Quail: Bobwhite quail were first introduced to southwestern Idaho during the early 1900s. They occur in limited numbers along the Snake River around irrigated agricultural areas from Marsing to the Idaho-Oregon border. The Idaho Department of Fish and Game (IDF&G) reports that numbers of these birds are quite low.

Hungarian Partridge: Hungarian Partridge were first introduced to Idaho during the early 1900s. Their occurrence and population numbers

are limited in the ES area. Most "Huns" are found in those areas where the shrub/grassland or grassland habitat type is adjacent to irrigated agriculture. Occasionally, Huns are found on the sagebrush/grass and grassland habitat type quite some distance from cropland. Populations of these birds in southwest Idaho have declined due to changes toward "cleaner" farming practices. Urbanization has also caused a loss of winter food and cover.

Chukar Partridge: Chukars were initially released in Idaho in the early 1950s. They occur throughout the ES area where appropriate habitat conditions exist. Steep rugged canyons, tallus slopes, rocky outcrops, and scattered brush and clumps of grass over irregular terrain comprise characteristic chukar habitat (Christensen, 1970). During dry periods, chukars concentrate around sources of water. Within the ES area, examples of areas having relatively high chukar populations are Salmon Falls Creek, King Hill Creek, and Reynolds Creek.

Mourning Doves: Mourning doves are native to, and are widely distributed throughout, the ES area. Their habitat requirements are quite broad and they can be found in the shrub/grassland, riparian, and agricultural land types. Water is an important component of their habitat and partially limits mourning dove distribution. Most migrate out of the ES area at the first sign of heavy frost and return again the following spring.

Pheasants: Introduction of Chinese ring-necked pheasants (Phasianus colchicus) into southeastern Idaho occurred along the Snake River Plain in the early 1900s. Pheasant populations in the ES area are limited to agricultural land or riparian habitat. Certain habitat requirements must be met in order for these birds to occupy the modern day farmland in the area. Winter cover and food are critical components of pheasant habitat. Therefore, year-round vegetation must exist in close proximity to any agricultural developments. Pheasant populations in southwestern Idaho are on the decline due primarily to a conversion of agricultural land into subdivisions. Clean farming practices also adversely affected numbers. Sprinkler systems and concrete ditches have eliminated considerable habitat needed for food and cover.

A few areas within the ES boundary still have fair to good populations of pheasants. These areas are primarily the small farms along the Snake River and adjacent drainages that still have suitable nesting and winter cover left for pheasants. Islands in the Snake River also provide good habitat. Areas of pheasant concentrations in the ES area are Hammett, Glens Ferry, King Hill Creek, Salmon Falls Creek, Reynolds Creek, Castle Creek, and the area from Marsing to Homedale.

Sage Grouse: Sage grouse are native to southwest Idaho. They have been observed in the ES area, primarily at strutting grounds. Strutting grounds are critical to sage grouse reproduction, and there is some evidence that the strutting ground is the hub of year-round activity (Eng and Schladweiler, 1972).

Strutting grounds within and bordering on the ES area have been surveyed. A total of nine grounds were checked, four within the ES

boundary and five just outside (1½ miles or less) the boundary. All are considered as active grounds and currently being used by sage grouse. Locations of these strutting grounds are shown on Map 2-6.

Sage grouse are dependent upon sagebrush for their survival. Martin (n.d.) found that from December through February sagebrush was the only food item found in all sage grouse crops. Only during the period of June through September did sagebrush make up less than 60 percent of the diet. Big sagebrush (*Artemesia tridentata*) is critically important as sage grouse nesting cover. Ninety-two percent of approximately 300 nests found by Patterson (1952) were under sagebrush.

Nest sites are usually located within two miles of a strutting ground (Martin, n.d.). Klebenow (1969) found that the greatest number of brood observations were in open stands of sagebrush; and as the summer progressed, broods moved up in elevation following a gradient of green food plants. During late summer sage grouse move back down to the sagebrush vegetation type for winter cover and food. Low growth forms of sagebrush usually provide the winter food and cover.

Waterfowl:

The season of use and relative abundance of waterfowl which use the ES area can be found in Appendix 2-7. In addition to the Canada goose, nine other species of waterfowl are known to breed in the ES area. Sixteen other members of this family are known to use the ES area at some time during the year.

Islands in the Snake River are important to both duck and goose nesting. These islands provide good nesting cover and security from terrestrial predators and disturbance. For this reason, Canada goose nest surveys are run by Idaho Department of Fish and Game (IDF&G) and Fish and Wildlife Service (FWS) personnel on the Snake River. In 1978, on the river from King Hill Bridge to Indian Cove Bridge, a total of 17 goose nests were found to be active. The section of river between Walters Ferry and Marsing was found to support 19 active goose nests. The section from Marsing to the Oregon Border was found to support 114 active nests.

While many of the waterfowl that nest in the ES area tend to migrate in the fall, there is an influx of northern geese which arrive in the fall and winter along the Snake River. Some geese are resident in the area year round.

Canada geese feed heavily on agricultural crops (barley, oats, wheat, rye, and corn) during spring and summer. The remainder of the summer diet consists of aquatic vegetation and insects. During winter, the geese depend almost solely upon aquatic vegetation and waste grains with little or no animal matter taken into the diet.

Areas within the ES boundaries, other than the Snake River, which are commonly used by breeding, wintering, and migrating ducks include Blair Trail Reservoir, Emigrant Crossing Reservoir, Morrow Reservoir,

TABLE 2-8

BREEDING CHRONOLOGY OF RAVENS AND RAPTORS IN THE SNAKE RIVER BIRDS OF PREY STUDY AREA, 1976

Species	First Arrival	First Courtship	Laying X Range	Hatch X range N	Fledge X range N	First** Young Dispersed	Last Young Seen**	Last Adult Breeding Season (Days)
Golden Eagle	*	22 Jan	2 Mar 8 Feb-22 Mar	17 Apr 24 Mar-6 May	6 Jun 23 May-27 Jun	2 Jun	11 Aug	* 202
Red-tailed hawk	4 Feb	13 Feb	6 Apr 23 May-21 May	6 May 22 Apr-20 Jun	11 Jun 29 May-21 Jun	8 Jun	8 Aug	24 Aug 177
Prairie falcon	18 Jan	22 Jan	13 Apr 1 Apr- 6 May	13 May 1 May-5 Jun 13	9 Jun 21 May-26 Jun 15	12 Jun	21 Jul	5 Aug 181
Ferruginous hawk	4 Mar	26 Mar	23 Apr 14 Apr-7 May	23 May 14 May-6 Jun 6	22 Jun 14 Jun-12 Jul 5	29 Jun	27 Jul	30 Jul 123
Raven	*	22 Jan	4 Apr 17 Mar-29 Apr	4 May 16 Apr-28 May 8	1 Jun 15 May-10 Jun 14	5 Jun	6 Aug	* 197

* Year round residents

** First date that a fledgling cannot be located near its natal site if it is not observed on subsequent visits.

***Date that last young of species was seen in vicinity of natal site.

Salmon Falls Creek, Foreman Reservoir, and the Bruneau River. At times ducks can be observed anywhere in the ES area where canals, streams, or ponds are present.

Most ducks in the ES area are surface feeders. The mallard, pintail, gadwall, and wigeon consume approximately 90 percent plant matter and 10 percent animal matter (Martin, Zim, and Nelson, 1961). The blue-winged teal, cinnamon teal, and shoveler have a diet consisting of 75 percent plant foods and 25 percent animal foods. Agricultural areas containing cereal grains, corn, and alfalfa provide a considerable amount of food for ducks during the fall and winter period.

Raptors:

A total of 21 raptor species use the ES area at some time during the year. In addition, four other raptor species have been reported in the area, but their occurrence is accidental. Of the 21 regularly occurring species, sixteen breed in the ES area and five occur in the area during the winter. Six are owls and fifteen are diurnal raptors (daytime feeders). A listing of these birds, their season of use, relative abundance, and life form can be found in Appendix 2-7.

Of the breeding raptors in the ES area seven are cliff nesters, five are tree nesters, and four are ground nesters. Raptors such as the golden eagle, prairie falcon, and ferruginous hawk are traditional nesters and often return to the same nest or same immediate area that was used the previous season. Birds which are traditional to the ES area depend on it for fulfillment of their breeding cycle. Breeding chronology for some of the common raptors in the ES area can be seen in Table 2-8.

Most of these birds hunt in the grassland and shrub/grassland habitat types. Their major prey species (food sources) are black-tailed jack rabbits, mountain cottontails, Townsend ground squirrels, various passerine birds, chukar, quail, and reptiles. These prey species are most often found in the grassland, shrub/grassland or rocky cliffs and canyon habitat types.

Rabbit populations fluctuate in numbers on a seven to ten year cyclic basis (Gross et al., 1974). Since rabbits are an important prey species, this cycle has a direct effect on certain raptor populations in the area (such as golden eagles and ferruginous hawks). Colonies of Townsend ground squirrels, although quite numerous north of the Snake River, occur only in one small localized area south of the river - the vicinity of Fossil Butte. Therefore, raptors which depend upon Townsend ground squirrels hunt primarily north of the river.

The ES area is located south and east of the Birds of Prey Natural Area (BPNA). Raptors foraging in the ES area are not highly dependent upon Townsend ground squirrels for prey. Common prey species found south of the BPNA include Belding ground squirrels, rabbits, passerine birds, upland birds, and various reptiles.

Dunstan (BPNA Annual Report, 1977) found individual ranges of eagles during the breeding season to be from 4.7 to 62.6 square kilometers, with a mean of 18.1 square kilometers (1.8 to 24.5 square miles, with a mean of 7.1 square miles). Individual ranges of red-tailed hawks during the breeding season were found to be from 2.1 to 59.5 sq. km., with a mean of 19.3 sq. km. (0.82 to 23.2 square miles, with a mean of 7.5 square miles). Individual ranges of prairie falcons during the breeding season were found to be from 49.7 to 134.9 sq. km., with a mean of 83.4 sq. km. (19.4 to 52.7 square miles, with a mean of 32.6 square miles).

Raptor foraging ranges for golden eagles, prairie falcons, ferruginous hawks, Swainson's hawks, red-tailed hawks, and burrowing owls are depicted on Map 2-6. These distances are calculated from maximum average foraging range determined to exist in the BPNA. However, since the configuration of the foraging area may differ from nest to nest, the actual maximum distance may vary somewhat from the boundary shown.

Birds of Prey are sensitive creatures and require a high degree of solitude during their reproductive cycle. Without this seclusion, breeding attempts often fail or are only partially successful. In addition to a lack of disturbance, raptors also need large foraging areas in order to obtain food for themselves and their young.

Discussion of the ferruginous hawk, osprey, merlin (pigeon hawk), and western burrowing owl can be found in the sensitive species section. Discussion of the bald eagle can be found in the endangered species section.

Other Non-game Birds:

There are 84 species of non-game birds (not including birds of prey) which breed within the ES area. In addition there are 58 migrant bird species (excluding raptors) that use the ES area sometime during the year. The breeding birds are listed in Appendix 2-7. Season of use, relative abundance and life form (for the breeding birds) is also shown in the Appendix. Because the shrub/grassland habitat type is the most dominant in the ES area, birds which are dependent upon this type are most abundant. These birds include the sage sparrow, sage thrasher, vesper sparrow, black-throated sparrow, and the lark sparrow. Other habitat types such as riparian habitats offer high species diversity, but the amount of land covered by the riparian habitat type within the ES area is low compared to the shrub/grassland type. Overall, the total number of birds found in the riparian habitat type is relatively low.

A discussion of the long-billed curlew can be found in the sensitive species section.

Reptiles and Amphibians

There are six lizard, nine snake, and eight amphibian species which occur in the ES area. Appendix 2-7 lists these reptiles and amphibians,

their relative abundance, and their life form. The western spadefoot toad and the striped whipsnake are an amphibian and a reptile which are dependent upon the shrub/grassland habitat type which is dominant in the ES area.

The western ground snake is discussed in the sensitive species section.

Sensitive Species

In 1977, a Memorandum of Understanding was drawn up between IDF&G and BLM concerning sensitive wildlife species in Idaho. Sensitive species are defined as "wildlife in Idaho whose populations are consistently small and widely dispersed or whose ranges are restricted to few localities such that any appreciable reduction in numbers, habitat availability, or habitat conditions might severely affect their status." The Department and BLM have designated a list of sensitive species, and they have agreed to "insure, to the best of their abilities, that critical habitats and populations of sensitive species occurring on lands administered by the Bureau will be managed and/or conserved to maintain population numbers of these sensitive species." Sensitive species do not fall within the purview of the Endangered Species Act. However, it is Bureau policy "to ensure that the critical habitats of sensitive animals will be managed and/or conserved to minimize the need for listing those animals by either Federal or State governments in the future." Discussed below are those sensitive species which occur within the ES area.

Spotted Bat: The spotted bat is a bat of arid country such as that which lies within the ES area. These mammals occasionally enter buildings and caves, and feed on insects. Their favorite feeding sites are wet areas such as springs and ponds. Although none of these bats has been observed or reported in the ES area, there have been no inventories to determine their abundance. Reputable sources state that spotted bats occur in southern Idaho during spring, summer, and fall periods (Burt and Grossenheider, 1964; Larrison, 1967).

River Otter: A native to southwestern Idaho, the river otter is an aquatic mammal which eats fish, frogs, turtles, crayfish, insects, and on occasion, young birds. It enlarges and dens in burrows built by other animals. The burrows can be in brush piles or in tules, as much as one half mile from water. Most often dens are located in banks with an entrance below the water.

River otter inhabit scattered locations along the Snake River throughout the ES area (IDF&G). Another known otter location is Emigrant Crossing Reservoir (R. 10 E., T. 4 S., Section 28). Other suitable otter habitats exist in the ES area but have not been inventoried. The Bruneau River and Salmon Falls Creek, for example, may have otter present.

Bobcat: The bobcat, which is native to southwest Idaho, is scattered throughout the ES area where suitable habitat exists. This animal prefers rocky, brushy country for hunting prey and raising its young.

The den is usually a protected cavity or cave among rocks. Only one bobcat has been observed in the ES area (near King Hill Creek), but IDF&G, FWS, and BLM biologists believe that these animals occur throughout the area in association with brushy canyons and talus slopes.

Bobcats are known to feed on ground squirrels, pocket gophers, meadow mice, cottontails, and jackrabbits. Small or weak deer are occasionally preyed upon in the winter.

Bobcats are classified as furbearers, and in recent years the value of their pelts has increased. For this reason trapping pressure has also increased.

Mountain Quail: Mountain quail are inhabitants of dry, brushy mountain slopes. Their food consists of buds, seeds, grain and insects. They nest on the ground among brush. Within or adjacent to the ES area mountain quail are known to occur in the Reynolds Creek drainage and in the lower section of King Hill Creek (IDF&G). These locations are shown on Map 2-6.

Osprey: The Osprey breeds throughout the United States where suitable habitat exists. These birds are tied to bodies of water as their source of food is fish. They nest in trees, most often in dead snags near rivers and lakes in forested areas.

The Osprey is a nonbreeding migrant in the ES area during the spring and fall. They are found along the Snake River throughout the ES area for indefinite time periods.

Merlin: Merlins, or pigeon hawks, breed in Alaska, Canada, Washington, Montana, North Dakota, and northern Idaho. During spring and fall migrations they are rarely observed in the ES area. While they inhabit the ES area Merlins are most often found in trees which act as windbreaks, where they prey on smaller birds.

Ferruginous Hawk: Native to southwestern Idaho, the ferruginous hawk is a raptor that prefers open country. Nest sites can occur in trees, shrubs, on low cliffs, or on the ground. In the ES area, all nests found were ground nests. Breeding chronology for these birds can be seen in Table 2-8.

Nests in the ES area are usually stick nests found near the top of steep, sparsely vegetated hillsides. These hillsides are within the shrub/grassland habitat type, where the ferruginous hawk most often hunts. A total of eight nests were found, none of which were occupied (active) this year. Although these nests were not active this year, it is believed that they are traditional nest sites, and during years of high prey density (jackrabbits in particular) these nests will be re-occupied (FWS).

BLM Birds of Prey personnel (Birds of Prey annual report, 1976) found that Townsend pocket gophers and Townsend ground squirrels comprised 90 percent of the total prey biomass for ferruginous hawks. In

southern Idaho and northern Utah, Howard (1974) found that jackrabbits made up 91.7 percent and 86.2 percent of the total prey biomass in 1972 and 1973 respectively.

Most ferruginous hawks which nest in the Birds of Prey Study Area hunt north of the river for Townsend ground squirrels. Due to low Townsend ground squirrel populations south of the river, birds which would forage in the ES area depend more heavily upon the rabbit population which occurs in the shrub/-grassland habitat type. Townsend pocket gophers are also an important prey source to these birds.

Western Burrowing Owl: The burrowing owl is native to southwestern Idaho and nests in the ES area. A partial survey has been conducted and average maximum foraging ranges are included on Map 2-6.

Burrowing owls arrive here from mid-March to mid-April, and eggs are laid in April and early May. Family groups and colonies begin to disperse by late August.

The nest consists of an underground burrow which can be found in a number of different locations such as cut banks, arroyos, grasslands, agricultural areas, urban areas, and open situations. Burrowing owls usually depend on burrow starts made by other animals such as ground squirrels, badgers, and marmots. They are capable of digging their own burrow along banks or other suitable locations. The burrow is important for the owls nesting, shelter, protection from predators, thermoregulation, and social interactions. The burrow is often reused each year, but not necessarily by the same pair.

The burrowing owls' main source of food are insects; however, small rodents, reptiles, and birds are also preyed upon. They hunt in a variety of habitats in the ES area including shrub/grassland and agricultural areas. Three factors essential to good burrowing owl habitat are openness, short vegetation, and burrow availability (BLM tech. note 250).

Long-billed Curlew: The long-billed curlew was once distributed throughout the United States. Numbers have diminished, and now they chiefly reside in the western United States. This large shore bird migrates inland during the early spring to breed and rear young. Arrival of these birds to southwestern Idaho takes place during late March. Figure 2-11 illustrates the breeding chronology of long-billed curlews in southwestern Idaho.

Nesting habitat consists of the grassland habitat type. Curlews are colonial nesters, and nests can often be found quite close together. The nest consists of a grass-lined depression on the ground. During incubation and while the parents are raising young, they are very defensive. Adults cooperatively "swarm" or "mob" intruders in the breeding territory. The young are feathered and are able to walk and feed themselves several hours after hatching.

Curlews rely on invertebrates, both in and on top of the soil, as a food source. Early in the season, prey items include burrowed grubs, larvae, worms, and beetles. Grasshoppers become an important food source later in the season.

Three main areas of curlew concentration occur in the ES area. These areas are plotted on Map 2-6.

Western Ground Snake: The western ground snake is a secretive, nocturnal snake of arid and semi-arid regions. It is found within the shrub/grassland habitat type. Lowell Diller (personal communication) has made most of his observations of this species on fine, wind blown volcanic soil. This snake spends much of its time underground. It is known to frequent river bottoms, desert flats, sand hummocks, and rocky hillsides where there are pockets of loose soil. BLM personnel observed eight of these snakes in 1978 in habitat similar to that described above within the Snake River Birds of Prey Natural Area. Food consists of invertebrates such as spiders, centipedes, crickets, and insect larvae.

Little is known about this species in the ES area. One sighting was made in 1977 near the ES border. Using soil maps and available distribution maps (Stebbin, 1966) western ground snake habitat covers all of the ES area south of the Snake River from the Idaho-Oregon border east to the Bruneau River.

Endangered Species

Bald Eagle: The bald eagle is an endangered species listed on the Federal list of endangered and threatened species. Bald eagles occupy the ES area during the winter within the 90-mile reach of the Snake River from Walter's Ferry to Bliss, Idaho. Numbers range from three to fifteen birds, depending upon food availability. No permanent bald eagle roosting sites or concentrations have been identified.

Fisheries

Fifteen game fish species and ten non-game species have been collected in the past decade from the Snake River between the mouth of Salmon Falls Creek (RM 586.5) and Clark's Island (RM 419.0) near Marsing (see Map 2-4). A checklist showing common and scientific names is given in Table 2-9. In addition, the cutthroat trout (Salmo clarki) and the kokanee (Oncorhynchus nerka) are believed to occasionally and briefly inhabit the upstream portion of the ES area; the former in springs entering the river and the latter while moving down from impoundments some distance upstream. Coho Salmon (Oncorhynchus kisutch) are also found below Swan Falls dam in small numbers, usually in the fall. They originate from plants of hatchery fish in tributary reservoirs. The Shoshone sculpin (Cottus greenei) is probably present in the Snake River in the Salmon Falls Creek-Hagerman area (B. Bell, personal communication).

Abundance of Fish

Sturgeon are present in all free-flowing reaches of the river in the ES area. Abundance is said to be greater from Strike pool to Bliss Dam and from Swan Falls to Walter Ferry (Gibson 1975). Sturgeon are not

present in quantity in pools of hydro facilities, but some fish are taken in gently-flowing portions of the Snake River arm of C.J. Strike pool (personal contact - H. Pollard, Idaho Fish and Game Department, 4 October 1978). Rates of catch per hour are the only other indication of sturgeon abundance, and range as high as one fish (adult) each 6.6 hours.

In the following material, the most recent surveys are used for reference.

Section I - Mouth of Salmon Falls Creek (RM 586.5) to C.J. Strike (RM 494): Harvest records (Gibson and Mate 1976) suggest sizable populations of rainbow trout, channel catfish, and brown bullhead. Large inflows of spring water above Bliss Dam support a high-quality rainbow trout population (B. Bell, personal communications), and a few smallmouth bass and mountain whitefish are also caught. Below Bliss, channel catfish and smallmouth bass predominate, and brown bullhead, mountain whitefish, bluegill and black crappie are also common.

Of the non-game fish in Section I, northern squawfish are most abundant above Bliss Dam, and along with peamouth, are the most common non-game species below Bliss. Suckers, carp, chiselmouth, and redbreast shiners are occasionally taken by anglers.

Irving and Cuplin (1956) sampled the impounded portions of Section I in 1953-54 (see Appendix 2-8 Table A). Mountain whitefish were the most abundant game species, with few other game fish taken. More than 90 percent of the fish collected were non-game species, especially suckers and Utah chubs.

Section II - C.J. Strike Reservoir (RM 494): Reid (1974) sampled Section II in 1973. Appendix 2-8 Table B summarizes data for the entire reservoir. Eleven or more species of game fish and nine or more non-game species were found with each comprising about half of the total numbers in the sample. Largemouth bass were the dominant game fish, followed by bluegill and black crappie. A few rainbow trout and mountain whitefish were collected, almost all during the fall of the year. Most of the game fish sampled were small (less than 15 cm), and the majority were young-of-the-year.

Carp, suckers, northern squawfish, and chiselmouth were the most abundant non-game species, and most of these, with the exception of chiselmouth, were large (longer than 30 cm). Thus, the bulk of the live weight of fish in the reservoir is tied up in large individuals of species which would not be vulnerable to predation.

The Bruneau arm and the main portion of C.J. Strike Pool had greater relative fish densities (both about 75 game fish per hour of electrofishing) than the Snake arm (about 47 per hour). This difference seems correlated with habitat type.

Since the completion of Reid's survey in 1973, there are indications that some species abundance is shifting. Largemouth bass and black

TABLE 2-9

GAME FISH SPECIES FOR SNAKE RIVER
from
MOUTH OF SALMON FALLS CREEK
to
CLARKS ISLAND NEAR MARSING

NON-GAME FISH SPECIES CHECKLIST

COMMON NAME	SCIENTIFIC NAME	RIVER SECTION					COMMON NAME	SCIENTIFIC NAME	RIVER SECTION				
		I	II	III	IV	V			I	II	III	IV	V
Rainbow Trout	<u>Salmo Gairdneri</u>	X	X	X		X	Carp	<u>Cyprinus carpio</u>	X	X	X	X	X
Coho Salmon	<u>Oncorhynchus kisutch</u>	2				4	Largescale Sucker	<u>Catostomus macrocheilus</u>	X		X	X	X
Mountain Whitefish	<u>Prosopium williamsoni</u>	X	X	X		X	Bridgellip Sucker	<u>Catostomus columbianus</u>	X	X	X	X	X
Smallmouth Bass	<u>Micropterus dolomieu</u>	X	X	X		X	Northern Squawfish	<u>Ptychocheilus oregonensis</u>	X	X	X	X	X
Largemouth Bass	<u>Micropterus salmoides</u>	2	X	X		X	Chiselmouth	<u>Acrocheilus alutaceus</u>	X	X	X	X	X
Black Crappie	<u>Pomoxis nigromaculatus</u>	X	X	X		X	Peamouth	<u>Mylocheilus caurinus</u>	X	X	X	X	X
Warmouth	<u>Lepomis gulosus</u>		X				Redside Shiner	<u>Richardsonius balteatus</u>	X	X	X	X	X
Pumpkinseed	<u>Lepomis gibbosus</u>	2	X	X		X	Dace	<u>Rhinichthys</u> spp.		X			
Bluegill	<u>Lepomis macrochirus</u>	X	X	X		X	Sculpin	<u>Cottus</u> spp.	X	X	X	X*	X*
Yellow Perch	<u>Perca flavescens</u>	2	X	X		X	Tadpole madtom	<u>Noturus gyrinus</u>					X
Redear Sunfish	<u>Lepomis microlophus</u>					3?	White Sturgeon	<u>Acipenser transmontanus</u>	X	X	X	X	X
Channel Catfish	<u>Ictalurus punctatus</u>	X	X			X							
Flathead Catfish	<u>Pylodictis olivaris</u>	2											
Brown Bullhead	<u>Ictalurus nebulosus</u>	X	X										
Black Bullhead	<u>Ictalurus melas</u>					X							

X - Reported in literature since 1970.

1 - No survey of fish populations has been made; data from Angler Harvest Survey (Gibson & Mate, 1976).

2 - Present according to B. Bell (ID Fish & Game Dept., Jerome), Personal Communication.

3 - Listed by both Irving and Cuplin (1956) and Sigler et al. (1972), but may actually be misidentified Pumpkinseed (H. Pollard, ID Fish & Game Dept., Boise), Personal Communication.

4 - Present according to W. Reid (ID Fish & Game Dept., Garden City), Personal Communication.

Common and scientific names used are from the American Fisheries Society Special Publication Number 6, A List of Common and Scientific Names of Fishes from the United States and Canada, Third Edition, 1970.

*Identified (probably incorrectly) as the Shorthead Sculpin, *C. confusus*, by Sigler, et al., (1972).

Source: Data from Angler Harvest Survey (Gibson & Mate, 1976).

crappie appear to be declining in abundance, while channel catfish and smallmouth bass are significantly increasing, (W. Reid and H. Pollard, personal communication).

Section III - C.J. Strike dam (RM 494) downstream to Swan Falls reservoir (RM 457) flow line: Section III was sampled by Goodnight and Bowler (1973) in 1972 (see Appendix 2-8 Table C). Game species constituted only 11 percent of the number of fish caught; large (to 40 cm long) mountain whitefish, bluegill (6 to 9 cm long,) and black crappie (12 to 15 cm long) predominated.

Some large rainbow trout are also taken in the Strike tailwaters during the cooler months of the year (H. Pollard, personal communication).

Large (30 cm) carp and suckers were the most abundant non-game species. Young of the year carp and suckers were also common, and northern squawfish (most larger than 30 cm) were the only other species normally taken.

This portion of river has a very reduced game fish population. Catch rates averaged about one-third to one-fourth the catch rate in C.J. Strike Reservoir.

Section IV - Swan Falls Reservoir (RM 457): Two surveys have been made of Section IV. Sigler et al (1972) sampled in 1971, and Goodnight and Bowler (1973) sampled in 1972. Less than 5 percent of the fish collected in both studies were game fish (see Appendix 2-8 Table D). Most game fish were black crappie (10 to 13 cm long) and mountain whitefish. Non-game fish species composition was similar to that of upstream sections, with suckers, carp, and northern squawfish predominating. Squawfish and suckers were mostly young-of-the-year or yearlings. Most carp were larger (greater than 30 cm) and constituted the majority of the live weight of fish in the reservoir. The sample catch rate of game fish (13 fish per hour) was the lowest of any section of the river.

Section V - Swan Falls Dam (RM 457.7) to Clark's Island (RM 419): Three surveys were conducted on Section V. Sigler (1972) sampled in 1971, Goodnight and Bowler (1973) in 1972, and Gibson (1974) in 1973 and 1974. Gibson's data is used as being representative of Section V, all free-flowing water.

About 25 percent of all fish taken were game fish (Appendix 2-8 Table E). Channel catfish and smallmouth bass together made up 62 percent of the game fish collected in the three surveys. Most channel catfish were large (22 to 40 cm), and sizes of smallmouth bass ranged from 5 cm (young-of-the-year) to 30 cm. Most crappie were 18 to 22 cm in length, and bluegill were normally 6 to 16 cm.

Large rainbow trout (1 to 2 kg) and coho salmon were commonly taken by fishermen in the tailwaters of Swan Falls Dam in 1977 (H. Pollard, and W. Reid, personal communication).

As in other sections, large carp and suckers dominated the non-game species collections. Most squawfish were large, but the species was somewhat less abundant than in upstream sections. Chiselmouth ranged in size from 6 to 30 cm, and reidside shiners averaged 4 to 12 cm.

Age and Growth

Smallmouth bass from the freeflowing river below Swan Falls Dam were aged by Gibson (1974). They averaged about 8 to 9 cm at the end of their first year, 14 to 16 cm at the end of their second year, about 21 cm at the end of their third year, and about 25 cm at the end of their fourth year.

Gibson aged a few channel catfish and found fish older than 6 years, and 32 to 40 cm fish were not uncommon. The youngest fish he examined were 25 to 30 cm long and were in their fifth growing season. Of the bluegill he examined, a few were 6 to 8 years old (20 to 30 cm long) but most were 12 to 17 cm long and 3.5 years old. Black crappie displayed a similar age structure but were a few centimeters longer at each age.

A very limited amount of information on age and growth of largemouth bass is available from a study of C.J. Strike Reservoir by Reid (1974). His data, however, suggest that growth in that portion of the free-flowing river was considerably slower than in Strike Reservoir.

Competition and Prey Availability

It is clear that there is an abundance of non-game forage fish for important game fishes such as largemouth and smallmouth bass, black crappie, and channel catfish that are predatory as adults. On the other hand, most sections support substantial populations of northern squawfish that may compete with game species for food or prey upon them.

It is also significant that most river sections contain large densities of very large suckers and carp that are virtually immune to predation. These fish tie up large quantities of nutrients and energy in unusable form for a number of years. They, especially carp, rely on the same food resources (bottom invertebrates) as most juvenile game fish. Thus, the potential for competition for food appears significant between juvenile game and non-game species.

Food Abundance

Daily and seasonal fluctuations in water level in reservoirs and free-flowing sections such as between Strike and Swan Falls reduce the habitat carrying capacity for bottom organisms. Irving and Cuplin (1955) found that production of food organisms was excellent or good in non-fluctuating tailwaters and non-fluctuating impoundments, but poor in shallow impoundments with severe fluctuations (i.e., Swan Falls Reservoir with its 1.5 ft. daily vertical fluctuation), and virtually absent within the zone of fluctuation in tailwaters such as those of C.J. Strike Dam and Swan Falls Dam.

The fluctuations in water level and amount of sedimentation tend to shift the production of organisms from groups that are valuable food for fish game species to less preferred forms.

Cover and Habitat Type

Some general conclusions may be drawn from a study of fish distribution in C.J. Strike Reservoir, where Reid (1974) felt shoreline habitat was one of the primary factors limiting game fish. The greatest density of game fish was found along steep-gradient rock shorelines that were little affected by water level drawdown. Shallow mud, sand, and gravel areas only held game fish if riparian cover was present, and coves held more fish than areas of straighter shoreline. Such relationships probably result from differences in food availability among habitat types as well as differences in cover.

In the free-flowing river, the distribution of largemouth bass is restricted to the few quiet coves that are present. Black crappie are also normally associated with coves (H. Pollard, personal communication). Smallmouth bass are typically found in areas of rock and rubble, apparently more because of the food available there than because of the cover provided.

Temperature Requirements

Temperature-related fish kills occur nearly annually below Swan Falls Dam. Large numbers of adult mountain whitefish die as temperatures reach the summer maximum of approximately 25° C. (Reid, personal communication).

Entrainment and Impingement

A large number of pumping stations presently withdraw water for irrigation of adjacent land. These pumps may entrain fishes in the flow of water being pumped; or, if the pump intakes are screened, fishes may be held on those screens (impinged) by the intake flow until killed. Although the U.S. Fish and Wildlife Service recommends screening intakes with mesh size not greater than 3.5 mm and restricting approach velocity to 17 cm per sec, few (if any) existing intakes meet these recommendations (W. Reid, personal communication).

The magnitude of current fish mortality in the Snake River due to entrainment and impingement is completely unknown. Even if pump intakes were screened when installed, plant debris would clog them rapidly, requiring constant maintenance or removal.

Fisheries Downriver of the ES area

The Snake River supports large populations of resident and anadromous fish below Hells Canyon, which contribute to both sport and commercial fisheries in the Pacific Northwest. Chinook salmon and steelhead trout, which were native to the upper Snake, were denied access to ancestral spawning and rearing reaches by construction of Brownlee, Oxbow, and Hells Canyon Dams. Chinook salmon, steelhead, and a remnant run of sockeye salmon to Redfish Lake in the upper Salmon River still return to the Snake River (USDO 1968, and personal communication with biologists of

Idaho Fish and Game Department, 1978). The Snake River system produces fall, spring, and summer races of chinook, each with slightly different behavior and biology.

Resident fishes in the river reach below the ES area include small-mouth bass, white sturgeon, channel catfish, rainbow trout, brown bullhead, channel catfish, mountain whitefish, flathead catfish, black crappie, carp, squawfish, suckers, chiselmouth, and shiners.

Hydroelectric peaking causing daily water fluctuations limits fish and bottom insect production below IPC dams in Hells Canyon. Further downriver, beginning at lower Granite pool, habitat for resident and anadromous game fishes is reduced by hydro operations at Corps of Engineers dams, and conditions created by dams impede migration or cause mortalities in low and average flow years.

White Sturgeon

This species is considered "sensitive" by the BLM and Idaho Fish and Game Department. Sturgeon are present in all free-flowing reaches of the ES area and reproduce in these reaches as well. Sturgeon do not tolerate impounded waters, although they are seen occasionally in the gently-flowing Snake River arm of C.J. Strike Pool. There are about 205 miles of river in which sturgeon live and prosper in Idaho. The best portion of this is the 100 miles above Weiser, and the ES reach near Bliss is considered to be the finest sturgeon habitat in the entire Snake River. Growth of sturgeon throughout the ES area is excellent.

Limited comparison of fin rays from sturgeon in Hells Canyon and the ES area (Bell 1978) indicates that fish in the upper Snake grew about 12 to 16 percent faster than fish in Hells Canyon since construction of Idaho Power Company dams in the latter area.

This species reaches lengths of at least 10 feet in the ES area and has been recorded to weigh in excess of 600 pounds.

Very small sturgeon feed on aquatic invertebrates, largely insects. Large sturgeon consume molluscs, crayfish, and carrion. Sturgeon may live for as long as 100 years. The male reaches sexual maturity at 11 to 22 years, the female at 26 to 34 years.

The ES reach is currently closed to all but catch-and-release fishing for sturgeon. Catch rates have been as high as one fish each six angler-hours for larger sturgeon and up to eight fish of 9 to 18 inches in one angler-day.

WILD HORSES

Two wild horse herds are within the ES area (see Map 2-7 for general locations). The two herds will be discussed separately.

Owyhee Herd

There are approximately 50 wild horses in the Owyhee herd. These horses are offspring of unclaimed horses allowed to range free in the past. This herd is protected and managed in accordance with the Wild Horse Management Plan (WHMP), prepared in 1978. Under the WHMP, herd size will be maintained at 47 to 74 head in the area shown on Map 2-7. The WHMP is on file at the Boise District office.

Approximately 7,400 acres, or 5 percent, of the Owyhee herd's 156,600 acre range fall within the ES area. Here the land is drier and lower in elevation than the remainder of the range. Vegetation is primarily a salt-desert shrub and sagebrush/grass type, with general range condition best described as poor. Water is available here only during the winter and early spring months.

From field observations and aerial surveys by BLM personnel, it is apparent that the portion of the Owyhee herd range within the ES area receives only minimal horse use due to poor range condition, insufficient water, and close proximity to roads and human activity. The remaining areas of their range are more desirable and offer better habitat for the horses in terms of forage, water, cover, climate, and isolation from humans. It is in these areas where the horses prefer to remain, and do remain.

Saylor Creek Herd

Based upon aerial surveys and field observations by BLM personnel, there are approximately 75 wild horses in the Saylor Creek herd. These horses are offspring of unclaimed horses allowed to roam free in the past. Unlike the Owyhee herd, the Saylor Creek herd is not currently being managed under a Wild Horse Management Plan. Although the horses are still fully protected under law, specific herd range and optimum herd size has not yet been established for management purposes. The WHMP is scheduled for completion in 1983.

Map 2-7 shows the approximate range presently used by the Saylor Creek herd. This encompasses roughly 103,200 acres of which approximately 84,400 acres, or 82 percent, fall within the ES area. This range is defined primarily by available forage and water, existing fences, and human use areas. Water is the most limiting factor for the herd.

Of the fourteen water sources used by the horses, three are under BLM ownership, two are undeveloped springs, and nine are provided by adjacent farm projects in an agreement with the local livestock operators and are primarily intended for livestock use. In the past, only two sources have provided water year-round and did not freeze over. These two are owned by the adjacent farm projects and are the herd's primary source of water during the winter months. Refer to Map 2-7 for locations of these water sources.

Over the years as the area's human population and human activity has increased (from farms being established, more traffic on roads, increased numbers of access roads, greater ORV use, etc.,) the range of the wild horses has gradually become more restricted, as wild horses prefer to range away from people.

CULTURAL RESOURCES

Historic Resources

A historic site is the location of some human activity which took place after recorded history began for a given area. It need not be a standing structure but may take the form of buried artifacts or even a geographic location lacking physical remains where an important event is known to have occurred. Historic sites may best be described in reference to their associated time period.

Early 1800s

There are no specifically known camp sites of early French, British, and American fur trappers in the ES area, although the Hudson Bay Company's exploitation of beaver in the area is documented. This is probably due to the fragile nature of the evidence of these activities.

1840s to 1860

This period is marked by the American acquisition of the Oregon Territory in 1846 lending further impetus to westward movement of emigrants along the Oregon Trail. There are two major routes of the Oregon Trail within the ES area and several associated roads such as the Kelton Road which served as a freight and stage road from Utah. Map 2-8 illustrates the route of the Oregon Trail and locations where wagon ruts are still visible.

There are several known historic sites on private land associated with the Oregon Trail, including the Cold Springs Station, the Pilgrim Station, the Poison Creek Station, and the old townsite of Glenns Ferry. Givens Hot Spring and a trading post near Hagerman are also associated with the Oregon Trail, as is Three Island Crossing on the Snake River near the present town of Glenns Ferry.

1860s

The discovery of gold and silver in the Owyhee Mountains and the Boise Basin stimulated settlement in the ES area. A network of roads, railroads, stagelines, and river ferrys developed to meet the needs of the miners. Evidences of these support activities are still present in the ES area.

Post 1860s

Agriculture and livestock rose to a prominent position in the economy of the region after the 1860s and have remained dominant. Numerous old homesteads such as the Cold Springs Ranch occur in the ES area as do less permanent evidences of early livestock activities such as sheepherder and buckaroo camps.

Nearly all of the known sites mentioned previously are located on private land and would seemingly not be affected by agricultural development on adjacent lands. However, Federal agencies are also required to evaluate impacts federal undertakings may have on National Register eligible sites located on private land. Since these important historic sites are by nature more obvious than prehistoric or paleontological sites, they are more vulnerable to vandalism as described in Chapter 3; thus they are considered in this discussion.

The Oregon Trail has been designated as part of the National Historic Trails System, and all existing ruts in the ES area have been officially determined eligible for the National Register. In addition, Cold Springs Ranch and Station have also received an official eligibility determination. It is anticipated that several more historic sites and districts believed to be of National Register quality (Map 2-8) will receive official determinations of eligibility in the future, (personal communication, SHPO, Larry Jones, Feb. 1979). There are no historic sites within the ES area currently listed on the National Register of Historic Places.

There are currently a number of factors impacting historical resources in the ES area. These include livestock use, vandalism, weathering, and major repair or removal of historic structures. In addition, portions of the Oregon Trail on both public and private land have been plowed over in the course of farming.

Prehistoric Resources

The 65 known prehistoric sites in the ES area consist of the physical evidence left by early inhabitants beginning as long as 15,000 years ago. These areas of human activity were created by the probable ancestors of distinct Indian groups historically known as Northern Paiute, Shoshoni, and Bannock. Their way of life is often referred to as the Desert Culture subsistence pattern and is characterized by seasonal exploitation of various resources which included small and large game, camas and other edible plants, and fish.

Several overlapping types of sites are recognized in the ES area with varied activities suggested by the kinds of artifacts found in the sites. Most of the sites are open and consist of lithic (stone) tools and waste flakes created in their manufacture.

The following types of sites have been described in the ES area as the result of a number of archaeological surveys and a few excavations (see Map 2-9 for surveyed areas.)

Temporary Camp Sites

Temporary campsites are usually small and located near major drainages or prominent topographic features. They are often related to specific resources such as hunting or fishing and yield artifacts indicative of these activities.

Quarry or Workshop Sites

Quarry or workshop sites are associated with tool making or the acquisition of raw material for tools and are often found near rock outcroppings and drainages. They are characterized by the presence of flakes, hammerstones, and nodules of the source material.

Semi-Permanent Habitation Sites

Semi-permanent habitation sites may take the form of rock shelters, caves, boulder shelters, or open villages. They are generally found on major drainages. They usually exhibit a wider variety of artifacts such as projectile points, scrapers, and milling stones; sometimes pottery and such perishables as basketry and cordage are present. Features such as housepit depressions and fire hearths also characterize habitation sites.

Rock Alignments and Rock Art Sites

Rock alignments and rock art sites include stone rings, cairns, and walls. Rock art may take the form of petroglyphs (carvings) or pictographs (paintings). They may be found wherever suitable rock faces occur. These sites are often related to hunting activities.

Miscellaneous Sites

Miscellaneous sites include isolated artifact finds, burials, hunting blinds, and possible kill sites. The latter two types may occur in strategic hunting locations; the former two may be present in a wide variety of situations.

Attempts to predict site densities over a large area in the absence of a systematic sample inventory tend to grossly underestimate the number of actual sites present and are usually biased toward larger sites associated with prominent landforms or features (Schiffer, 1977). No attempt will be made to predict how many sites actually occur in the ES area, but limited generalizations may be made on the basis of past surveys.

The eastern portion of the ES area, including the Bennett Mountain Planning Unit north of the Snake River and portions of the Saylor Creek Planning Unit has consistently yielded low site densities, generally less

than one site per section of land surveyed (Cinadr, 1976; Pavesic and Moore, 1973; Bucy 1971, Geer, 1977; Murphey, 1977). Certain portions of Saylor Creek do appear to have slightly higher site densities of less than one site per section (Plew, 1976; Walters, in progress). The areas which include Marsing and Oreana have thus far produced the highest site densities in the ES area, ranging from slightly less than one to more than three sites per section (Young, in progress; Metzler, 1976, 1977).

It must be emphasized that these generalizations of site density may be extremely unreliable due to the varying quality and nature of the data obtained from surveys in the ES area.

None of the known 65 prehistoric sites in the ES area are listed on the National Register of Historic Places. A number of archaeological site districts have been identified as meeting National Register eligibility criteria (Appendix 1-3 and Map 2-8); however, no official determination of their eligibility has been sought to date. It is likely many of these site districts will receive formal eligibility determinations in the near future (Tom Green, SHPO, Jan. 1979, personal communication).

There are currently a number of factors impacting cultural resources in the ES area. These include cattle trampling and erosion and dune building (particularly in the Saylor Creek Bicentennial Fire area). Some other sites in the Saylor Creek area were inadvertently seeded over in BLM operations in 1976 (Geer, 1977). Some of the sites identified by Pavesic in 1973 and Bucy in 1971 were impacted by Desert Land Entry farming several years ago (Murphey, 1977). Sites throughout the ES area are being and have been vandalized by artifact hunters. Rock shelters, rock art, and large habitation sites are particularly vulnerable to this type of activity.

Paleontological Resources

The ES area is considered to be one of the most significant regions for paleontological research in North America, having yielded numerous and varied fossil specimens. At least eight localities rich in fossil remains have been reported in the ES area (see Map 2-8). Types of fossils recovered from the ES area include seeds, leaves, fish, molluscs, and large mammals. Scientists working in southwestern Idaho believe vertebrate remains, of which fossil mammals are a type, to have the most scientific value. The largest quantity of mammalian fossil material has been discovered in a layer of deposits known as the Glens Ferry Formation. The layer is found on both sides of the Snake River from just east of the town of Hagerman with outcrops found continuously as far west as the town of Homedale. In addition, portions of the Glens Ferry formation are found in the badlands south of the Snake River (Malde, 1972). Thus, this important layer of deposits embraces a large portion of the ES area.

At the present time the most important paleontological discoveries have been made where the Glens Ferry Formation outcrops along the Snake River near the town of Hagerman. Scientists working in this area have

recovered more than 150 fossil horse skulls along with the remains of other Ice-Age beasts. This area has been designated the Hagerman Fauna Sites National Natural Landmark and may be designated as a national monument in the future (Federal Register, Vol. 43, #82-Thursday, April 27, 1978, 4310-03-National Registry of Natural Landmarks).

The ES area has not been adequately inventoried for paleontological resources, but present evidence suggests additional sites are present in the Glenns Ferry Formation within the ES area. The current incidence of vandalism to these fossil sites is also not known, but some indiscriminant collecting has been known to occur. Significant paleontological resources are protected under the Antiquities Act of 1906 as "objects of scientific interest".

VISUAL RESOURCES

Visual resources are an integral part of the recreational experience in the ES area and include features such as land form, vegetation, water, color, and influence of adjacent scenery. They are perceived by local residents, recreationists, and highway travelers.

A systematic approach for identifying scenic quality and setting minimum quality standards for management of the visual resource values has been prepared for all BLM administered land (BLM Manual 8410). This process classifies land into one of five Visual Resource Management (VRM) classes. Each class contains specific management objectives for maintaining or enhancing visual resource values. VRM Classes within the ES area are shown on Map 2-10.

VRM Class I

VRM Class I applies only to designated special areas where management activities are to be restricted, such as National Trails. Usually only natural ecological changes are permitted, however, very limited management activity can occur. Any contrast created within the characteristic environment must not attract attention.

This class includes land within the Oregon Trail and Kelton Road corridors. Although both historic routes are eligible for inclusion into the National Register of Historic Places, the routes within the ES area have not yet been included in the National Register. Remnants of the Oregon Trail have been included in the National Trails System as a National Historic Trail. Since both historic routes have a high potential for public recreation use, a one-half mile corridor along either side of visible Oregon Trail and Kelton Road wagon ruts are rated VRM Class I to protect the visual quality of the trails. In sections where topography prevents viewing the full half mile, the corridors were reduced in width. Realizing the potential for public enjoyment of the historic routes will depend largely on preserving the natural appearance of land along the wagon roads in order that a feeling for the landscape as it was during the period of emigrant travel can be recaptured.

Also included in this class is the proposed National Monument at the pliocene fauna fossil beds of Hagerman Valley. This area is presently a designated National Natural Landmark.

VRM Class II

Changes in any of the basic landscape elements (form, line, color, texture) caused by management activity should not be evident in the characteristic landscape of VRM Class II land. Management units in this class include the Snake River corridor, Morrow Reservoir, Salmon Falls Creek, and King Hill Creek. Activities in the past have already resulted in dominant changes in the basic elements in most of these units. One example is road cuts in the canyon walls which result in unnatural landform lines and color contrasts from soil and vegetation removal.

VRM Class III

Contrasts to the basic elements caused by management activity may be evident in VRM Class III land. However, this land should remain subordinate to the existing characteristic landscape. Management units include Deadman Canyon, Emigrant Crossing, and Foremans Reservoirs.

VRM Class IV

Contrast may be a dominant feature in VRM Class IV land, however, changes must reflect the basic elements in the landscape. This class involves most of the land within the ES area. Most of the natural landscape in the ES area has little variety.

VRM Class V

VRM Class V applies to areas where the quality class has been reduced because of unacceptable cultural modifications. There were no Class V areas identified on public land within the ES area.

RECREATION

Most recreation use in the ES area occurs along the Snake River for water related or enhanced activities such as fishing, waterfowl hunting, boating, swimming, waterskiing, camping, and picnicking. The rangeland above the river is used for some hunting, off-road vehicle activities, and rockhounding. Sightseeing is common throughout the area.

In 1977, excluding sightseeing, recreation use in the ES area was estimated at 83,000 visitor days. Ninety-one percent of this use occurred along the Snake River. Although total sightseeing use has not been estimated, it is known that, during 1977, daylight motor vehicle use on primary and secondary roads amounted to 335,000 visitor days. The above

figures were based on information provided by the Idaho Department of Fish and Game, Idaho State Parks and Recreation Department, Idaho Department of Transportation, and the Idaho Power Company.

Fishing

Other than sightseeing use and visitation to the Three Island State Park, the greatest recreation use is fishing along the Snake River, which supports both warm and cold water species. A few tributary streams and reservoirs also support moderately good fisheries.

Fishing on the Snake River, major streams, and reservoirs is rated as follows:

	Warm Water Species	Cold Water Species
Bruneau River	Poor	Fair
Salmon Falls Creek	Fair	Fair
Sinker Creek	Poor	Good
Blair Trail and Morrow Reservoir	Fair	Poor
Emigrant Crossing Reservoir	Poor	Fair
Snake River		
Thousand Springs	Fair	Good
Indian Cove Bridge-Boise River	Good	Poor

Despite the fact that sturgeon fishing in the Snake River is declared "catch and release" only, sturgeon fishing continues to increase in popularity. A section of river approximately 12.6 miles long from Bliss Dam to King Hill contains the best sturgeon habitat and the best sturgeon population in the Magic Valley Region (Idaho Department of Fish and Game). Three other free-flowing reaches of the Snake River in and adjacent to the ES area that are white sturgeon habitat include Weiser to Swan Falls Dam, Swan Falls Reservoir to C.J. Strike Dam, and C.J. Strike Reservoir to Bliss Dam.

In 1977, fishing use was estimated at 26,200 visitor days. The 1975 National Survey of Hunting, Fishing, and Wildlife Associated Recreation by the U.S. Fish and Wildlife Service estimated that, on a national average, fishermen spent \$11.50 per fishing day. Based on this estimate, \$301,300 (\$11.50 x 26,200 fisherman days) were spent for fishing on water within the ES area in 1977.

Sightseeing

The presence of several major roads through the ES area accounts for sightseeing as the major recreational use. The total of 335,000 visitor days of daylight motor vehicle use on primary and secondary roads is not a true measurement of sightseeing use since travelers are traveling for a variety of purposes. Sightseeing opportunities are best along and adjacent to the Snake River where scenic values are higher and where more concentrated wildlife populations can be viewed.

Near Hagerman, the Snake River has eroded away sedimentary deposits revealing fossils of an ancient ecosystem. This area, which is viewed and studied by casual visitors and educational institutions, is a designated National Natural Landmark and has been studied and proposed for inclusion into the National Park System as the Hagerman Fauna Sites National Monument.

There is a high potential for "historic" sightseeing. Documented portions of the Oregon Trail and Kelton Road still remain visible (see Map 2-10). Remnants of the Oregon Trail have been included in the National Trails System as a National Historic Trail. The National Park Service has initiated preparation of a management plan for the Oregon National Historic Trail. The plan, which will be completed by September 1981, will identify significant route segments and sites with high historic and/or recreation values. For each identified segment, the plan will address boundary, development and management needs and actions. It is likely that the Oregon Trail remnants within the eastern one-half of the ES area will be identified as significant route segments by the National Park Service. Stage stations and remains of old homesteads and ferry sites may also be viewed throughout the area. Three Island State Park, where the Oregon Trail crosses the Snake River, offers interpretive hiking trails, wagon rides, a visitor center, and historical displays (see Map 2-11). Refer to the preceding discussion on history and archaeology for a summary of these resources.

Wild horses can be viewed in the Saylor Creek portion of the ES area.

Hunting

All public land in the area is open for hunting. Hunttable populations of waterfowl and upland game exist in the area. Waterfowl hunting, the most popular hunting use, occurs along the Snake River, C.J. Strike Reservoir, Bruneau River, Morrow and Foreman Reservoirs, along creeks, and on ponds. Populations of pheasants exists primarily on private property in irrigated farming areas where there is ample cover during the spring, fall, and winter months. Hunting, however, may be restricted on private property. Valley quail hunting opportunities occur throughout the ES area in irrigated agricultural areas which are adjacent to the shrub/ grassland habitat and along river valleys and creeks. Excellent opportunities occur along Mudflat Road and in the Castle Creek area. Chukar partridge hunting exists in areas of steep terrain and rough topography, particularly where canyons intersect the Snake River. Hungarian partridge and cottontail rabbit hunting also exists throughout the ES area, although hunter harvest is minimal and usually incidental to pheasant or chukar hunting. Hunting demand peaks in the fall, most noticeably during opening weekend of waterfowl season.

Hunting pressure for big game is quite low, corresponding to low game populations. Big game species are normally at higher elevations outside the ES area. Although deer are occasionally spotted on Snake River islands and major creek bottoms there are very few in the ES area south of the Snake River.

It is estimated that 7,500 hunter days were expended within the ES area during 1977. The 1975 National Survey of Hunting, Fishing, and Wildlife-Associated Recreation by the U.S. Fish and Wildlife Service estimated that on a national average hunters spent \$12.20 per hunting day. Based on this estimate, \$91,500 ($\$12.20 \times 7,500$ hunter days) were expended on hunting within the ES area during 1977.

Off-Road Vehicle Use

Recreational use of off-road vehicles (ORV) is very popular in southwestern Idaho. The majority of use is by motorcyclists. It is estimated that 35 percent of trailbike use in Idaho occurs in ten counties within southwestern Idaho (Idaho's State Off-Road Motor Vehicle Plan, August 1977). The majority of the ORV use in the ES area occurs on public land near the towns of Marsing, Murphy, Bruneau, Hammett, Glenns Ferry, and Hagerman (see Map 2-11). An area south of Grand View receives low use, but offers good potential. Many competitive events, such as motorcycle races sponsored by off-road vehicle clubs, are held throughout the area.

Approximately 171,385 acres of public land within the ES area are used by motorcyclists. In 1977, an estimated 4,148 visitor days (motorcyclists) were expended in the ES area. Highest use occurs near Murphy and Hagerman. There are several intensively used areas near Murphy and near Hagerman, heavy use occurs just west of the Owsley Bridge and on designated motorcycle trails within the Hagerman Fossil Beds. ORV use is restricted to roads and trails within the Fossil Beds to prevent damage to paleontological resources. In the other intensively used areas concentrated ORV has caused soil erosion and vegetative damage. During the peak season, an estimated 100 to 150 motorcyclists may use these areas per weekend (Idaho Department of Parks and Recreation). The challenging terrain, soil characteristics, networks of trails and primitive roads, and good access of these areas near Murphy and Hagerman account for the intensive use.

It is estimated that 60 percent of the ORV use is for trailbiking with the remaining 40 percent four-wheel drive use. Applying this percentage to the 4,148 visitor days of motorcycle use, the total ORV use in the ES area is estimated to be 6,900 visitor days.

Collecting

A portion of the ES area west and south of the Snake River is well known by rockhounds for its resource of various rock specimens. (See Map 2-11 for location of collecting areas.) Materials collected within the ES area include petrified conifer cones and pitcher sandstone. Fossils, mostly along the prehistoric lakeshore west and south of the Snake River, are also found. However, indiscriminate collecting of objects of scientific value is prohibited by the Antiquities Act of 1906.



Wildhorses



ORV



Wildlife



Livestock Grazing

FIGURE 2-12. Public land uses.

Water Sports

In addition to fishing, the Snake River offers opportunities for rafting, canoeing, powerboating, and waterskiing at reservoirs along the Snake River. Rafting and canoeing are gaining in popularity along unimpounded stretches of the river, especially on the Wiley reach below Lower Salmon Falls Dam which is also used for fast-water fishing. There are 69 public land islands on the Snake River within the ES area. These are accessible by boat and are an important resource for activities such as hunting, fishing, camping, picnicking, and nature study.

Facilities

Most of the visitor use in the ES area is of the extensive type. Normally, these activities are carried out in the natural environment. Man-made facilities are limited to developed access areas (see Map 2-11).

Developed recreation sites within and near the ES area include Three Island State Park, Bruneau Sand Dunes State Park, boat launching sites, and a city park at Homedale, Marsing, Hammett, and Glens Ferry. One of the most popular recreation areas near the ES area is C.J. Strike Reservoir on the Snake River which offers many water-related recreation opportunities. On the reservoir, recreation facilities are provided by the BLM, Idaho Department of Fish and Game, and commercial interests. In addition, a privately operated indoor swimming pool is located at Givens Hot Springs near Marsing.

Three Island State Park located at Glens Ferry is opened year-round and offers campground and picnic facilities, interpretive hiking trails, a swimming area, fishing, restroom facilities, historical displays, and a visitor center. During 1977, 66,200 people visited this park.

During the same year, 71,981 individuals visited the Bruneau Sand Dunes State Park, adjacent to the ES area east of Bruneau.

WILDERNESS

Under Section 603 of the Federal Land Policy and Management Act (FLPMA), the BLM is responsible for ensuring that all public land, including that within the ES area, is inventoried for wilderness characteristics as described in the Wilderness Act of 1964. Land found to possess wilderness characteristics is to be managed during the study and reporting process required by Section 603 of FLPMA so as not to impair its suitability for preservation as wilderness.

Special authorization to conduct an accelerated inventory of wilderness characteristics within the ES area was issued on August 23, 1978, by the Director of the BLM. As a result of this inventory, three areas totalling 62,641 acres, including 2,625 acres within the ES area and 60,016 acres of contiguous wildlands, have been designated as Wilderness

Study Areas (see Map 2-8). These areas are presently undergoing formal public review. Following completion of the public review period, the BLM will issue a final decision identifying Wilderness Study Areas within the ES area. Such areas will be retained in public ownership and will be considered unavailable for agricultural development until Congress acts on the President's recommendation on the suitability of the areas for designation as wilderness.

The proposed Wilderness Study Areas identified on Map 2-8 are generally dominated by plant and animal communities representative of northern desert shrub and douglas-fir forest ecosystems. Topography varies from gently-rolling tableland to steep mountain terrain. These areas are not generally representative of the types of areas already designated as units of the National Wilderness Preservation system.

Wilderness-oriented recreational use within the proposed Wilderness Study Areas shown on Map 2-8 is rated low at present.

LIVESTOCK GRAZING

Livestock grazing is a major use of public land within the ES area. Private livestock operators are issued licenses by the BLM to graze animals on public rangeland. This public land is divided into management units called "allotments". All or part of 24 grazing allotments fall within the ES area (see Map 2-12). There are 127 individual operators licensed to graze livestock within the ES area. Seventeen of the 127 operators have licenses in 2 allotments, and 4 have licenses in 3 allotments. Seven allotments have only one operator in each. The remaining 17 allotments are designated as common allotments and have from 2 to 48 operators licensed in each (see Table 2-10). Currently 418,580 acres within the ES area are used for livestock grazing.

Operators are generally licensed to graze their livestock in specific allotments based upon historic use, location of their private property, type of livestock operation, and type of range vegetation. The period they use the public land is often critical to the success of their operation.

Vegetation surveys determined stocking rates of the range in "animal unit months" (AUMs) per year for livestock based upon available forage. Grazing use was then adjudicated to eligible livestock operators as "grazing qualifications" (AUMs) for specific allotments, specific type and number of livestock, and specific seasons of the year. The annual fee charged by the BLM currently is \$1.89 per AUM.

Grazing use within the ES area is based primarily upon the following range vegetation surveys: Wilson Unit, 1962; Pole Creek Unit, 1965; Tindall Unit, 1959; Hammett Unit, 1940; and Saylor Creek Unit, 1965 (all on file at the BLM Boise District Office).

Table 2-10 illustrates licensed active grazing qualifications (AUMs) for each operator in each allotment. This table presents a

TABLE 2-10

CURRENT GRAZING USE, BY ALLOTMENT

Allotment	Operator	Class	Season	Active Grazing Qualifications (AUMs)
Graveyard Point	(1) H. Markley	C	Sp	113
Poison Creek	(1) R. Bruce	C	Sp	172
	(2) G. Johnstone	C	Sp	250
French John Area	(1) M. Quintana	S	Sp	38
	(1) T. Blackstock	C	Sp	177
Elephant Butte	(2) R. Pershall	C	Sp	92
	(1) H. Brandau	C	Sp Su F	440
River Group	(2) R. Brandau	C	Sp Su F	241
	(3) Chipmunk Grazing Association	C	Sp Su	72
	(4) A. Curtis	C	Sp Su F	93
Reynolds Creek Group	(5) C. Johnston	C	Sp Su F	293
	(6) B. MalMBERG	C	Sp Su F	90
	(7) C. McVahan	C	Sp Su F	489
	(1) H. Bass	C	Sp Su	565
	(2) J. Bass	C	Sp Su	493
	(3) W. Boston	C	Sp Su	104
	(4) C.T. Ranch Co.	C	Sp	1594
Field	(5) E. Jaca	C	Sp Su	244
	(6) R. McKee	C	Sp Su	81
	(7) W. Thomkins	C	Sp Su	1239
	(1) H. Brandau	C	Sp	42
	(2) R. Brandau	C	Sp	30
	(3) Chipmunk Grazing Association	C	Sp	877
	(4) C.T. Ranch	C	Sp	376
	(5) E. Jaca	C	Sp Su F	2198
Oreana #1	(6) C. Johnston	C	Sp	77
	(7) C. McVahan	C	Sp	126
	(8) J. Nettleton	C	Sp Su F	1133
	(1) Joyce Livestock	C	F W	966
Nahas Ind.	(2) J. Nettleton	C	F	525
	(1) R. T. Nahas	C	Sp Su F	1463

1/ Class - Type of livestock: C=Cattle, S=Sheep, H=Horses

2/ Season - General season of licensed use. Exact dates may vary somewhat from year to year.

Sp=Spring=April, May, June

Su=Summer=July, August, September

F=Fall=October, November, December

W=Winter=January, February, March

3/ Active Grazing Qualifications (AUMs) - Active grazing use licensed for the individual operator, as adjudicated from the range surveys. Sometimes an operator will choose not to use the full number of AUMs for which he is licensed. As a result, actual use may vary up to 8 percent on an average from year to year.

TABLE 2-10 (Continued)

Operator	Class	Season	Active Grazing Qualifications (AUMs)	
(1) Joyce Livestock	C	Sp Su F	4952	
(2) J. Nettleton	C	Sp Su F	1133	
Fossil Butte	(1) O. Cox	F W	93	
	(2) Joyce Livestock	H	F W	108
Oreana #2	(3) Miller Land Co	C	F W	961
	(4) R.T. Nahas	C	W	213
	(5) C. Steiner	C	F W	861
Oreana #3	(1) O. Cox	C	F W	26
	(2) Hayland Ranches	C	Sp Su	2725
	(3) R. T. Nahas	C	Sp Su F W	465
Castle Creek Winter	(1) P. Black	C	Sp Su F W	1677
	(2) Burghardt Co.	C	F W	68
	(3) B. Collett	C	F W	275
	(4) Glens Ferry Grazing Assoc.	C	F W	910
Battle Creek Spring, Summer, Fall	(5) G. King	C	F W	90
	(6) L. Maupin	C	F W	2155
	(7) 9-K Ranch	C	F W	250
	(8) C. Steiner	C	F W	481
	(1) J. Black	C	F W	168
	(2) P. Black	C	Sp Su	1372
	(3) Bruneau Cattle Co.	C	Sp Su	782
Battle Creek Winter	(4) Colyer Cattle Co.	C	Sp Su	5649
	(5) D. Lahtiner	C	Sp Su	3370
	(6) C. Sellman	H	Sp Su F	25
	(7) Urtiquidi & Ocamica	C	Sp Su	1224
	(1) Burghardt Co.	C	Sp Su	325
	(2) P. Black	C	Sp Su F	366
	(3) Bruneau Cattle Co.	C	F W	276
Tindall Northwest	(1) Guthries Rancho Idaho	C	Sp Su F W	11,501
	(2) A. Harley, Jr.	C	Sp Su F	960
	(3) L. Rodge	C	Sp Su F	390
	(4) C. Sellman	C	Sp Su	354
Chalk Flats	(1) D. McSheehy	C	Sp F	2068
	(2) G. Withers	C	Sp F	333
	(3) Hammett Livst. Co.	S	Sp F	110

TABLE 2-10 (Continued)

Allotment	Operator	Class	Season	Active Grazing Qualifications (AUMs)	
Sunnyside Spring, Fall 1/		S	Sp F	1365	
		C	Sp F	23,910	
	Hammett #1	(1) S.D. Blackwell	C	Sp Su	95
		(2) F. Phelps & Sons	C	Sp Su F	1632
		(3) G. Presley	C	Sp Su F	1207
(4) 2-Plus Ranches		C	Sp Su F	1398	
	(5) H.L.C.	S		120	
Hammett #2	(1) D. Wicher	C	Sp	400	
	(2) H.L.C.	S		55	
Hammett #3	(1) B. Stephens	H	F W	240	
Hammett #4	(1) P. Batruel	C	Sp F	62	
	(2) S.S. Blackwell	C	Sp F	470	
	(3) W. Brinson	C	Sp	195	
	(4) Double Anchor Ranches	C		404	
	(5) Half Moon Ranch	C	Sp F	1035	
	(6) C. Kast	C	Sp F	242	
	(7) D. McShehey	C	Sp F	1036	
	(8) J. Mills	C	Sp	27	
	(9) R. Ross, est.	C	Sp F	390	
	(10) Russell Inc.	C	Sp F	240	
	(11) 2-Plus Ranches	C	Sp F	1235	
	(12) R. Vineer	C	Sp F	473	
	(13) W. Walker	C	Sp F	588	
	(14) D. Wicher	C	F	150	
	(15) H.L.C.	S	Sp F	314	
Hammett #5	(1) Double Anchor Ranches	C	Sp F	1924	
Saylor Creek	(1) R. Adolf	C	Sp Su F	750	
	(2) Arkoosh & Zidan	S	Sp	1190	
		C	Sp Su	880	
	(3) E. Ascuna	C	Sp Su F	609	
	(4) E. Astorquia	S	Sp F	2508	
		C	Sp Su F	600	
	(5) J. Barinaga & Sons	S	Sp	200	
	(6) C. Berry	C	Sp Su F W	2100	
	(7) A. Black	C	F W	630	
	(8) J. Black	C	F W	1059	
	(9) R. Brailsford	C	Sp Su F	283	
	(10) D. Carnahan	C	Sp Su F	983	
(11) I. Carnahan	C	Sp Su F	198		
(12) Faulkner Land & Livestock	S	Sp F	4005		
		C	Sp Su	1010	

TABLE 2-10 (Continued)

Allotment	Operator	Class	Season	Active Grazing Qualifications (AUMs)
Saylor Creek (cont.)	(13) Flying Triangle Inc.	S	Sp F W	1203
		C	Sp Su F	1960
	(14) Guerry Inc.	S	Sp	250
	(15) W.B. Hall	C	Sp Su F	998
	(16) Hammett Lvstck Company	S	Sp F W	2480
		C	Sp Su F	4000
	(17) J. Jewett	C	Sp Su F	510
	(18) C. Johnson	C	Sp Su F	175
	(19) S. Johnson	C	Sp Su F	72
	(20) L. Jolley	C	Sp Su F	435
	(21) Jones & Sandy Livestock Co.	S	Sp	810
		C	Sp Su F	1860
	(22) S. Jones	C	Sp Su F	150
	(23) D. Keck	C	Sp Su F	800
	(24) R. Kerbs	C	Sp Su F W	2338
	(25) C. Kevan	C	Sp Su F	135
	(26) David Kinyon	C	Sp Su F	724
	(27) Denver Kinyon	C	Sp Su F	949
	(28) K. Kubik	C	Sp Su	480
	(29) S. Leguineche	C	Sp	258
	(30) S. Lehmann	C	Sp Su F	682
	(31) E. Miller	C	Sp Su F	904
	(32) Noh Sheep Co.	S	F	315
	(33) Patterson L&L Co.S	C	Sp	625
	(34) E. Perkins	C	Sp Su F W	2100
	(35) J. Potucek	C	Sp Su F	411
	(36) B. Pruett	C	Sp Su F	413
	(37) R. Ring	C	Sp Su	127
	(38) Salmon Falls Sheep Co.	S	Sp	600
		C	Sp	960
	(39) K. Seese	C	Sp Su F	383
	(40) Mrs. T. Shenk	C	Sp Su	8
	(41) Simplot Lvstck Company	S	Sp W	840
		C	Sp W	2208
	(42) Sllman Sheep Co.	S	Sp	650
	(43) J.L. Solosabal	C	Sp Su F	1080
	(44) R. Steele	C	Sp Su F	413
	(45) Tevs Angus Farms	C	Sp Su	101
	(46) M. Thompson	C	Sp Su F	1794
	(47) L. Trall	C	Sp Su F	1005
	(48) Wells Livestock Company	S	Sp	200

1/ This allotment has 20 operators with a total of 25,275 AUMs active licensed use. Since only a small portion of this would possibly be lost to agricultural development (refer to Map 2-12, and Chapters 3 and 8) it is not necessary to show further breakdown by operators.

SOURCE: BLM Grazing Case Files

TABLE 2-11

ACRES AND AUMs WITHIN THE ES AREA, BY ALLOTMENT

Allotment	Total Allotment Acres 1/	Total Allotment AUMs 2/	Acres of Public Land Within the ES Area 3/	AUMs Within the ES Area 4/
Graveyard Point	3,292	113	1,165	40
Poison Creek	7,760	422	450	25
French John Creek	830	38	315	15
Elephant Butte	10,163	269	3,870	99
River Group	16,507	1,718	1,785	131
Reynolds Creek Group	38,061	4,320	4,255	239
Black Mountain Field	70,124	4,859	3,800	223
Oreana #1	27,436	1,491	425	123
Nahas Individual	11,421	1,463	1,460	44
Oreana #2	46,395	6,085	5,155	256
Fossil Butte	53,063	2,262	18,420	469
Oreana #3	45,512	4,867	4,650	52
Castle Creek Winter	70,745	4,397	23,330	1,188
Battle Creek SP/Su/F	26,010	276	11,280	120
Battle Creek Winter	117,485	13,113	6,245	312
Tindall Northwest	191,870	13,205	24,220	1,426
Chalk Flat	11,530	2,511	445	29
Sunnyside Sp/F	223,610	25,275	755	53
Hammett #1	28,951	4,452	9,645	2,176
Hammett #2	2,800	455	2,800	400
Hammett #3	2,640	240	640	67
Hammett #4	52,737	6,861	42,670	5,782
Hammett #5	13,983	1,924	900	101
Saylor Creek	541,401	53,411	249,900	28,027
TOTALS	1,614,326	154,037	418,580 5/	41,397

1/ Total Allotment Acres: Public lands presently used for livestock grazing within the allotment. (see Map 2-12).

2/ Total Allotment AUMs: Licensed active grazing use within the allotment. These figures are based upon range survey adjudications and reflect current licenses.

3/ Acres of Public Land Within the ES Area: Public land presently used for livestock grazing within the ES area portion of the allotment. (see Map 2-12)

4/ AUMs Within the ES Area: Licensed active grazing use within the ES Area portion of the allotment. These figures are based upon range survey adjudications and field estimates by BIM personnel, derived from current licensed stocking rates.

5/ This figure does not include present wildlife leave areas, restricted right-of-way, or other areas not presently allotted for livestock grazing.

SOURCE: BIM grazing case files and 1940, 1959, 1962, 1965 range surveys.

general idea of the current types of livestock operations in the ES area. More detailed information can be obtained from the individual case files at the BLM Boise District Office.

Table 2-11 shows total acres of public land and total AUMs licensed in each of the 24 allotments as well as the number of acres and AUMs of each allotment which fall within the ES area.

In the past, sheep had been the most common type of domestic livestock grazing on the federal range. Since the 1950s, however, there has been a gradual shift from sheep to cattle use. As can be seen from Table 2-10, approximately 88 percent of the total licensed AUMs are used by cattle, 11 percent are used by sheep, and less than 1 percent are used by horses.

In general, the sheep operators use the public land for grazing during spring, or spring and fall season, and drive their flocks to higher elevation National Forest land for summer. They generally spend the winter and early spring lambing season on private land.

Typically, cattle operators run a cow-calf operation. Cattle are generally turned out onto public land in early spring and gathered during late spring, summer, or fall. Some lower elevation range areas are better suited for winter grazing, however, and receive late fall and winter use. To round out a year-long livestock operation, the operators move their cattle to state, National Forest, or private land during the seasons they do not use the BLM administered range.

To move the livestock from allotment to allotment or from public land to and from private, National Forest, or state land, the operators generally trail (drive) their herds or flocks. Most livestock are moved through the area along common "driveways". Saylor Creek allotment has designated stock driveways for livestock movement. Operators who do not use these routes move their animals cross country through their allotment or obtain permits from BLM to travel through other allotments. Most trail along dirt or gravel roads. Stock driveways and customary trailing routes are shown on (Map 2-12).

A number of range improvements for livestock are located within the ES area. BLM improvements found on the public land within the ES area consist of 87,085 acres of range grass seedings 140 miles of fenceline, 18 miles of water pipeline, 9 cattleguards, 9 check dams, 8 water troughs, and 4 developed springs or wells. Records of locations of privately owned or maintained improvements within the ES area are incomplete.

AGRICULTURE

Ownership of land within the ES area are in three basic groups: private, state, and federal. Table 1-2 in Chapter 1 gives land ownership statistics for each county in the ES area. The private land is used almost exclusively for agriculture and there are about 165,000 acres of

private farmland in the ES area. In some areas, such as the private land along the Snake River southeast of Marsing, rural home sites are being developed on small acreages which encroach on existing agricultural development. Many of the small towns, both within and outside of the ES area, are expanding in the same fashion into the more desirable living areas thus reducing the existing agricultural land.

Map 2-14 depicts the general ownership of land within the ES area as well as the existing generalized land uses.

Much of the public land in the ES area is encumbered by applications under the Desert Land Act or the Carey Act for development into farm units. Much of this land is included in multiple applications which consist of over filings of Desert Land Act applications or Carey Act over Desert Land Act. The following table shows number, type, and approximate acreage of applications within the ES area as of January 1, 1979.

<u>Number of Applications</u>	<u>Type of Application</u>	<u>Approximate Acreage</u>
531	Desert Land Act	150,000
16	Carey Act	120,000

The table above does not indicate the number of acres involved in multiple applications. There are about 56,000 acres where CA projects have filed over DLA filings, and about 8,000 acres of DLA filings over other DLA applications. Map 1-3 in Chapter 1 shows the DLA and CA applications on public land in the ES area as of January 1, 1979.

MINERAL RESOURCES

Locatables

Only two locatable minerals are known to be present: diatomite and oolitic limestone (see Map 2-13). Four diatomite occurrences are known to exist within the study area: 1) T. 1 S., R. 3 W., Sec. 14, 15, 22 and 23, 2) T. 5 S., R. 9 E., Sec. 15, 3) T. 5 S., and 6 S., R. 10 E. and 11 E. (Pasadena Valley), 4) T. 6 S., R. 10 E., Sec. 15 and 22 (Rosevear Gulch).

Pursuant to a BLM mineral investigation in 1958, the Reynolds #1-4 mining claims located in T. 1 S., R. 3 W., Sec. 14, 22 and 23 were excepted from Public Law 167 inclusion, allowing surface management right by the claimants. Of the other known diatomite deposits, only the Rosevear Gulch material has experienced commercial exploitation, there having been about eight "carloads" of diatomite produced during the 1930s. The remaining deposits appear to be commercially infeasible at the present time.

A fairly extensive (estimated 80 million tons) deposit of oolitic limestone occurs in T. 7 S., R. 3 E., Sec. 4 and 9, where a local resident has seven placer claims and a processing plant. According to the owner, he mines about 200 tons a month. He produces a chicken food (calcium) supplement for regional markets. Patent to the claims has been applied for and, if granted, the land would pass into private ownership.

The presence of commercial-grade locatable commodities suggests the probable occurrence of as yet undiscovered valuable materials. Many of these can be expected to increase in value as presently exploited deposits are exhausted or new uses are found for the minerals.

Leasables

The United States Geological Survey (USGS) has classified large portions of the Snake River Plain as prospectively valuable for oil, gas, and geothermal resources. Within the ES area, there currently are 21 oil and gas leases covering approximately 21,550 acres. About one-fourth of the ES area is underlain by the enormous Bruneau-Grandview hot water aquifer, and there are 71 geothermal leases accounting for approximately 84,500 acres within the ES area. Both the Castle Creek and Bruneau KGRAs (Known Geothermal Resource Area) are located within the ES area boundaries. There have been some temperature gradient wells drilled in the Castle Creek area.

Salables

In calendar year 1977, there were seventeen active free use permits and one major material sale contract within the ES area, accounting for a reported 350,000 cubic yards of sand and gravel removed. Although production can vary drastically from year to year, the annual average is estimated to be on the order of 150,000 cubic yards, including free use permits, material sale contracts, and unauthorized removal.

Of notable importance is a cement aggregate-quality sand and gravel deposit in T. 5 S., R. 10 E., Sec. 25, for which a firm in Mountain Home has a long-term material sale contract. A high quality sand deposit occurs in T. 6 S., R. 3 E., Sec. 21 and 28. In addition, relatively low grade bentonite and volcanic ash deposits are known to occur within the ES area, although none is believed to be of much economic significance.

LAND USE PLANS, CONTROLS, AND CONSTRAINTS

The ES area is affected by county-wide comprehensive land use plans for Owyhee, Elmore, and Twin Falls Counties. Owyhee and Twin Falls Counties land use plans were developed in the mid-1970s through a coordinated effort of a private consultant and appropriate county planning authorities. Elmore County developed its land use plan through its Planning and Zoning Commission. The vast majority of the land in the ES area is classified for some type of agricultural development or use as (native) range grazing land. Owyhee County has classified its agricultural land into Class 1 and Class 2 based on the Idaho Water Resources Board classification of irrigated and potentially irrigable land. Recommendations for this classification include giving highest priority for agricultural development. Land with a Class 1 or 2 designation will continue to be used as rangeland until it is feasible for irrigation.

Elmore County has made a broad, generalized classification of its land within the ES area as being in "Agricultural A". The "Agriculture

A" area includes all farm and rangeland, except the City Impact and Rural Residential classification areas. The "Agricultural A" areas are irrigated farmland of high priority or land well outside the city zones that if allowed to intensively develop would present a leap-frog effect of development and in the long run would cost the taxpayer more money to service than if development were kept close in the existing service areas. Density allowable within the "Agricultural A" area shall be one single-family residential unit per 40 acres and other agricultural related developments. Agriculture, therefore, is the main use.

That portion of Twin Falls County located in the ES area is divided into categories of "agricultural" and "farm/range." The "agricultural" designations are areas containing the productive farmland which are generally composed of the best agricultural soils. In most instances these areas are also irrigated. The plan states, "One of the most critical factors in protecting productive agricultural land is to maintain large land parcels which can be farmed on an economical basis. It is recommended that 40 acres be the minimum size parcel in these areas. It is recognized that some agricultural operations, such as feed lots, are economical on smaller parcels. However, agricultural trends change, and to maintain viable options requires maintaining usable areas of land. The recommendation of 40 acres is not by any means a magical figure which will in itself solve all problems. Rather, it is a minimum acreage which has been successfully implemented in many rural areas and as such has proved to be a workable size."

The "farm/range" designation area contains both agricultural and grazing uses. It is looked upon as being an opportunity area as portions may eventually come under irrigation and could then become highly productive cropland. If this occurs, then certain areas could be reclassified as "agricultural". Because a large number of acres are needed to support grazing operations, it is recommended that the minimum parcel size be 80 acres.

In summary, it appears that the proposed or recommended land uses in the respective county land use plans are focused on the use of land for agriculture or grazing throughout the ES area with allowance for some rural residential use which is incident to agricultural uses.

There are 33 parcels of state owned land within the ES area totaling 18,284 acres (see Table 1-2). These parcels are illustrated on the maps contained in this document and most are under livestock grazing leases. The revenues generated are used for Idaho public school funding. Through continued cooperative planning, most of these parcels have been designated by the Idaho Department of Lands for eventual exchange to the BLM so that both agencies could block up land holdings. This would lead to more effective land management opportunities.

TRANSPORTATION NETWORKS

Transportation networks within or directly affecting the ES area consist mostly of secondary (two lane) paved roads and many miles of

gravel or dirt roads which provide transportation routes to outlying farm areas. State Route 45 from Kuna enters the ES area at Walters Ferry about 17 miles upstream on the Snake River from Marsing and connects the towns of Murphy, Oreana, Grandview, and Bruneau with an all-weather paved road. State Route 51, the only all-weather paved road which goes north to south, passes through the ES area just south of Bruneau and is the main route between Mountain Home and the Nevada border. Interstate 80N is the primary means of travelling from east to west in the region and is located 10 to 20 miles north of the ES area in most locations and passes through the ES area in the vicinity of Glens Ferry, Hammett, and King Hill. The Union Pacific Railroad operates a spur line which serves Homedale and Marsing at the northwest end of the ES area and a main line which parallels I-80 where it passes through the ES area.

Utility transportation systems, such as powerlines and pipelines, are located along main surface transportation systems such as the existing railroads, highways, and the interstate highway. Secondary service lines are numerous and serve all residences, irrigation pumps, etc. The main utility transportation systems within the ES area are the high voltage electrical transmission lines located south of King Hill which run northwest to southeast. Two of these lines originate at the Upper and Lower Salmon Falls Power Plants on the Snake River just east of the ES area. Petroleum product pipelines run diagonally through the ES area parallel to the above mentioned power transmission line. All of these utility transportation system components are shown on Map 2-14.

SOCIO-ECONOMIC CONDITIONS

The ES area is predominantly rural and agricultural. Agriculture and food processing are the two industries that export products outside the ES area and provide the area's economic base. The government sector is also important in providing jobs and earnings.

The market area, which includes Canyon County, is highly dependent on agriculture and food processing. In addition, Canyon County exports many services to the Boise area which further strengthens the market area economy. The potential market area for this analysis has been identified as Canyon, Elmore, Twin Falls, and Owyhee Counties. Canyon County is not a part of the ES area, but has been included in the following analysis for comparison. The impact of Canyon County in the market area will be addressed in Chapter 3.

Population

The population of Elmore, Owyhee and Twin Falls counties were estimated to be 72,962 persons in 1975. This represents 9 percent of the State's total population. Approximately 64 percent of the Tri-County population is in Twin Falls County, with 26 percent in Elmore County and 10 percent in Owyhee County.

As noted in Table 2-12, males comprise approximately 50.4 percent of the area population. This is slightly higher than the state average of

49.1 percent. Elmore County, with its influx of personnel at Mountain Home Air Force Base, is significantly higher at 53.7 percent males followed closely by Owyhee County with 52.1 percent.

TABLE 2-12
POPULATION, 1975

County	Population	Females	Males	PCT Females	PCT Males
Elmore	19,244	8,897	10,347	46.2	53.7
Owyhee	7,182	3,439	3,743	47.8	52.1
Twin Falls	46,536	23,839	22,696	51.2	48.7
TOTAL	72,962	36,175	36,786	49.5	50.4
State	787,080	395,828	391,424	50.2	49.7
Canyon	67,790	34,653	33,138	51.1	48.8

SOURCE: Meale, Robin and Jack Weeks. 1978. Population and Employment Forecast-State of Idaho Series 2 - Projections 1975-2000. Department of Water Resources and Boise State University Center for Research, Grants and Contracts, Boise, Idaho.

Average annual growth rates were determined for the 1960-1970 period and the 1970-1975 period (see Table 2-13).

TABLE 2-13
ANNUAL GROWTH RATES

	1960-1970	1970-1975
Elmore	.45	1.92
Owyhee	.07	2.23
Twin Falls	- .01	2.14
TOTAL	.12	2.09
Canyon	.6	2.02

SOURCE: Idaho Department of Water Resources.

TABLE 2-14
EARNINGS BY MAJOR ECONOMIC SECTOR
(Thousands of Dollars)

1976

	Elmore	Owyhee	Twin Falls	Study Area	Canyon
Total Labor & Proprietor's Earnings by Place of Work	88,125	16,706	220,790	325,621	287,514
By Industry:					
Farm	8,952	4,422	39,000	52,374	32,449
Non-Farm	79,173	12,824	181,790	273,787	255,065
(Private)	23,043	8,535	155,320	186,898	226,298
Manufacturing	2,957	1,090	28,031	32,078	74,083
Mining	(L)	(D)	329	329	485
Contract Construction	3,071	1,689	18,667	23,427	17,939
Wholesale & Retail Trade	6,787*	2,974	51,627	61,388	55,838
Finance, Insurance, & Real Estate	1,893	345	9,146	11,384	8,432
Transportation & Public Utilities	4,009	650	17,858	22,517	20,440
Services	2,892	994	27,856	31,742	46,526
Other Industries	(D)	(D)	1,806	1,806	2,555
Government	56,130	3,749	26,470	86,349	28,767
Federal Civilian	9,081	1,164	5,821	16,066	3,226
Federal Military	41,188	116	864	42,168	1,339
State and Local	5,861	2,469	19,785	28,115	24,202

* - Wholesale Data not shown in order to avoid disclosure, but included in totals.

(D) - Not shown in order to avoid disclosure; data included in totals.

(L) - Less than \$50,000; data included in totals.

SOURCES: Bureau of Economic Analysis, Regional Economics Information System, "Personal Income by Major Sources," July 1978.

Earnings by Major Economic Sector

Table 2-14 displays earnings in the area by major economic structure. The area has total earnings of \$325,621,000. In the area, 84 percent of total earnings are from non-farm industries. The largest earning sector in private industries of the area is wholesale and retail trade.

The most active sector in Elmore County is government with Federal military comprising almost 73 percent of the government economic structure. Farming is the most influential sector in Owyhee County, representing approximately 26 percent of total labor and proprietor's earnings. Twin Falls County statistics show high activity in wholesale and retail trade; farm industries; and federal, state, and local governments.

Labor Force

The 1977 average unemployment rate for the area was 5.9 percent which is slightly lower than the state unemployment rate of 6.3 percent (see Table 2-15). (The following analysis is based on average unadjusted employment figures and unemployment rates (see Appendix 2-9 for definitions).

Elmore County has the highest 1977 unemployment rate with 6.7 percent. Elmore County's average labor force is 5,859 persons; its average total unemployment is 389 persons; and its average total employment is 5,470 persons.

Owyhee County has the lowest unemployment rate with 4.7 percent. Its average 1977 labor force is 4,515 persons; its total unemployment is 208 persons; and its total employment is 4,307 persons.

Twin Falls County has an unemployment rate of 6.3 percent. The 1977 labor force is 23,234 persons; the total unemployment is 1,445 persons; and the total employment is 21,788 persons.

Canyon County, for comparison, has an unemployment rate of 5.5 percent. Its average 1977 labor force is 37,420 persons; its total unemployment is 3,228 persons; and its total employment is 35,399 persons.

TABLE 2-15

RESIDENT LABOR FORCE

1977

	Elmore	Owyhee	Twin Falls	3 County Total	State	Canyon
Employment, Unadj.	5,470	4,307	21,758	31,565	384,067	35,399
Unemp, Unadj.	389	208	1,445	1,942	25,700	3,228
Labor Force, Unadj.	5,859	4,515	23,234	33,608	409,767	37,420
Unemp. Rate Unadj.	6.6	4.6	6.2	5.8	6.3	8.6

SOURCE: Idaho Department of Employment, unpublished 1977 labor force information.

TABLE 2-16

EMPLOYMENT SUMMARY

1976

	Elmore	Owyhee	Twin Falls	ES Area Total	State	Canyon
Agriculture	717	1,414	2,768	4,899	38,600	4,973
Food Processing	--	--	1,574	1,574	16,675	4,020
Wood Products	--	--	65	65	18,133	853
Other Manufacturing	--	--	274	274	10,726	--
Construction	146	93	1,152	1,391	17,142	1,017
Mining	--	32	--	32	3,325	35
Trans., Comm., And Utilities	131	100	1,332	1,563	17,133	1,570
Wholesale and Retail Trade	748	376	5,304	6,428	72,800	5,856
Finance, Ins., and Real Estate	224	57	691	972	15,392	887
Services and Misc.	275	126	2,327	2,728	48,767	4,433
Government	1,505	464	3,068	5,037	64,467	3,653
TOTALS	3,986	2,777	19,268	26,031	329,650	29,178

(--) - Indicate no employment, employment data withheld to avoid disclosure, or data not tabulated for this year; data included in totals.

SOURCES: Agricultural Employment Data from an Idaho Department of Employment, 1976 Unpublished Report. All other data from Bureau of Research and Analysis, Basic Economic Data For Idaho, Idaho Department of Employment, March 1978.

TABLE 2-17

PER CAPITA REVENUES AND EXPENDITURES

1975

(Rounded to the Nearest Dollar)

	ELMORE		OWYHEE		TWIN FALLS		CANYON	
	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.
Property Tax	136		199		172		170	
Education Transfers*	154		190		129		147	
Revenue Sharing <u>1/</u>	10		18		11		22	
Highway Transfers**	28		47		37		21	
School Costs		67		112		66		85
Street and Highway Costs		12		21		16		13
Solid Waste Costs <u>1/</u>		1.40		7		1		2.50
Cemetery, Fire, Irrigation Drainage, etc.		.75		5		2		3.56
Water Distribution Costs		-0-		.35		.15		-0-
Local Government Functions								
Cities		24		11		40		35
County		32		50		35		35

* Education Transfers consist of State Education Foundation Apportionment, State Apportionment to County General Schools, Teachers Retirement and Social Security, and School Lunch and Drivers Education Fund.

** Highway Transfers consist of Highway Users Revenue and State Highway Matching Funds.

1/ 1975 Annual Financial Reports of the Respective Counties.

SOURCES: Associated Taxpayers of Idaho, Mac Yost, Boise, Idaho.

Employment by Major Economic Sector

According to Table 2-16, 19 percent of persons employed in the area in 1976 were in the agricultural sector, while approximately 12 percent of persons employed statewide were in agriculture. Over 50 percent of those employed in Owyhee County are classified in the agricultural sector.

The most active economic sector in the area is wholesale and retail trade; the least active is mining.

While approximately 14 percent of Twin Falls County employees are in the agricultural sector, 27 percent participate in the services and miscellaneous sector and 16 percent are employed by federal, state, and local governments.

Per Capita Revenues and Expenditures

Table 2-17 shows county revenue and expenditures on a per capita basis for local services. The largest revenue category in Elmore County is education, representing 33 percent of local services. Property tax in Owyhee County is the largest with 30 percent. In Twin Falls, property tax is 34 percent of local services.

School costs represent the highest expenditure in each county. For the combined area of Elmore, Owyhee, and Twin Falls Counties, school costs are 15 percent of total local services.

Generally, Owyhee County has high per capita costs of government functions and property taxes. This is moderated to some extent by state aid transfers which are high on a per capita basis. These figures are not surprising in light of the large size of Owyhee County and the small number of residents living there. Property taxes are larger due to the average size of private holdings in the county compared to smaller sites for the more urbanized counties. Also, because of the ratio of area to people, Owyhee County receives high per capita transfers for highways, education, and federal revenue sharing. The result, as it effects Owyhee County residents, is that they generally get a larger amount of state and federal dollars per person than other counties.

Social Values

For the past 90 years agriculture has been a major component in the economic as well as the socio-cultural composition of Idaho. Its influences have encouraged the development, within the long-term residents of the State, of a generally conservative political posture, a strong sense of independence, a pride in ingenuity (being able to fashion ideas as well as objects to fit personal needs), a reluctance toward government regulations and intervention, and a deep interest in land use matters.

Many of these characteristics are reflected in material produced by a private research firm that conducted attitudinal surveys in the State in 1973 and 1975. Both surveys were conducted by Opinions Research West, a Boise firm. The surveys were commissioned by the Idaho Water Resource Board. Since the firm is no longer in business, original data could not be obtained. All references herein are from the two available publications produced by the firm). These surveys were administered to a sample of the population in each of the six regions of the State, established by the State Water Resource Board. Several items in the surveys pertain to the attitudes of the general public toward agricultural development in the ES area.

For example, in its conclusion on the subject of whether Idaho residents (the general public) favor an increase in the amount of irrigated land, the firm stated that over half of the respondents approve the placement of more sagebrush or dry farmland under irrigation. The results (of the survey) in 1973 (64.04%) provide an even greater endorsement than those of 1972 (50.2%) ("A Survey of Public Attitudes and Opinions," December, 1973, Opinions Research West, Boise, 1973, p. 26.)

Data relating to agricultural development in the 1975 survey also indicate support from the general public for the development of irrigated farmland. In answer to a question asking how many thousands of acres they (respondents) would designate for irrigation development if they were the decisionmakers, about 36 percent indicated they would favor maintaining no more than the present average (about 30,000 acres per year). In comparison, 47 percent said they felt more irrigated acreage would be desirable. These data are summarized in Table 2-18.

TABLE 2-18
QUESTIONNAIRE ITEM RESPONSES

Question: ". . . how much irrigated land should be added each year?"

<u>Alternatives</u>	<u>Percent Response</u>
None, or take land out of production	2.88
10,000 acres or less	4.81
10,001 to 20,000	3.85
20,001 to 30,000	24.04
30,001 and more	47.11
Don't know/no response	17.31

SOURCE: "A Survey of Public Attitudes and Opinions," June, 1975, "Opinions Research West," 1975. p. 25.

While these statistics point out that, apparently, the general public, in 1975 and 1973, favored an increase in the amount of sage/dry land to be placed under irrigation, the feeling was not unanimous. Some contend that the number of supporters in the general public would have been diminished if the respondents had been aware of the costs involved in electrical pumping, costs which would have been shared by the urban residents.

However, in 1978, 56 percent of the farmers and residents (based on nine interviews with community leaders and citizens conducted in September 1978) of the area did not view growth as being entirely beneficial. Primarily, farmers did not want increased competition in the marketplace from new production. Most farm receipts are not providing a living wage for farmers. Additional competition without increased demand would lower returns even further. The rest of the results from those nine interviews, though not statistically significant, are presented for information purposes.

Outside of the farm, the schools and the churches serve as the main forum of social interaction. Almost 90 percent of the ES area residents questioned felt that the school system represents the major formally organized system in the area. Because of the location of schools in the ES area, children must spend one or more hours each day riding the school buses.

Most people questioned (56 percent) felt that the school systems offered them the opportunity to have some input into their community by attending parent-teacher organization meetings. They also felt that these gatherings were necessary as an opportunity to exchange ideas and meet new area residents. Due to the rural nature of the counties in the ES area, there are few other opportunities for social interaction. Quite often the discussions at school functions center around farm planning and operations.

The numerous churches in the ES area are also gathering places for many residents one or more times each week. No single denomination stands out as dominant at the present time. Women's groups related to church activities are strong and numerous. These groups meet on regularly scheduled dates providing an opportunity for exchanges of ideas and general social interactions. These activities further tie the county residents together into tight knit brotherhoods sharing common lifestyles and goals. The church meetings provide opportunities for the men to meet new farmers in the area and establish neighbor relationships with other people. The result is that people have a sense of security though neighbors may live a considerable distance away. Help is generally available from friends when needed to perform jobs or provide a ride to a shopping area. The lack of a fully developed community social structure emphasizes the importance of grazing and farm organizations. Examples of these are the Owyhee Cattlemen's Association, the Farm Bureau, and the Bruneau Ditch Company. These organizations provide input to the political process as special interest groups, and they serve as a communications link between their members.

Attitudes and Values Regarding Quality of Life

Quality of life indicators show that in more categories the counties in the ES area are below the national average. However, 67 percent of those people interviewed in September 1978 said they wanted to raise their children in a rural atmosphere. Twenty-two percent had lived in larger cities (Boise, Twin Falls, Pocatello) before moving to the ES area. Many residents drive to Boise, Nampa, Caldwell, and Twin Falls for services and goods not readily available in the ES area.

The extremely rural nature of the ES area coupled with a strong sense of independence produces a fragmented power structure characterized by many diverse groups, but no dominant group.

The existing agricultural activities provide jobs that are attractive to and frequently held by illegal aliens. The U.S. Immigration Service has estimated that upward to 90 percent of the pipe movers in southwest Idaho are illegal aliens.

ENERGY

The description of the energy environment will be divided into electrical energy, which is used in the ES area primarily for irrigation pumping, and chemical energy, which is used mainly in the form of fuel, fertilizers, and pesticides.

Electrical Energy Environment

There are an estimated 165,000 acres currently irrigated with water from the ES reach of the Snake River. In almost all cases, electric motors are used to pump the irrigation water. Electricity is assumed to be the most likely power source for future irrigation in the area.

The ES area falls within the service area of Idaho Power Company (IPC). (See Map 2-15). Unless privately-owned small-scale generation facilities were built by consumers, IPC would be the sole supplier for future electricity consumption in the area.

Idaho Power Company is an investor-owned electric utility, regulated by the State of Idaho through the Idaho Public Utilities Commission (IPUC). In addition to supplying customers in its service area, IPC has "firm" long-term contracts to sell electricity to the Weiser municipal utility and to two other private utilities in Nevada and Oregon.

Idaho Power Electricity Supply

The IPC system is based primarily on hydroelectric power. In a normal water year, about 70 percent of IPC's generation is from dams, compared with 30 percent from thermal (fossil fuel) facilities.

The IPC dams are shown in Map 2-15. IPC's largest hydroelectric facility is the T.E. Roach Complex, consisting of Brownlee, Oxbow, and Hell's Canyon Dams. Normally, these three dams which have a nameplate capacity of 942 megawatts (MW), account for about 70 percent of IPC's total hydroelectric output.

Idaho Power Company's major thermal facility is a one-third, 500 MW, interest in the Jim Bridger coal-fired plant near Rock Springs, Wyoming. An addition to the Bridger plant will be completed in 1979, increasing IPC's share of the Bridger complex by about 33 percent, from 500 to 667 MW. In addition, IPC owns two smaller facilities near Salmon and near Hailey, Idaho. A list of all IPC owned generating facilities is contained in Appendix 2-10.

Besides company-owned resources, IPC has several firm contracts to purchase from or exchange power with other utilities. IPC imports power primarily in the summer to meet summer peak demand and generally exports power to other utilities during winter and spring.

In addition to firm contracts, IPC has been able to make special short-term purchases in times of extreme deficits, such as were caused by the 1977 drought.

Because IPC depends on dams for a large part of its generation, IPC's capability to produce electricity varies seasonally and yearly with streamflows. From its dams, IPC can produce about 8 million megawatt hours (MWH) in a median water year, compared with 5.5 million MWH in a low-flow year. Within a given year, streamflows are highest in the winter and spring and lowest in July and August, giving IPC greater generating potential (sometimes more water than the dams can handle) in spring than in summer.

Another factor with seasonal effects on IPCs generating capability is irrigation diversion of water upstream from the IPC dams. In spring months when flows are high, this water may not have been usable for generation at all the downstream dams; but in the summer, for every acre-foot of water diverted, there is a corresponding loss of generation at every dam downstream. Eight IPC dams are currently or potentially affected by diversions by agriculture in the ES area. Table 2-19 shows those dams and a value in kilowatt-hours (KWH) of electricity that can be generated at each of them by an acre-foot of water passing through the turbines.

Hydroelectric losses resulting from existing depletions have reached significant levels. Idaho Power Company estimated 1976 losses at 213,000 MWH total, with a monthly high of 85,700 MWH or 117 average MW in July. These losses are the subject of some controversy and have resulted in complaints filed with the IPUC by a consumer group (Idaho Water Rights Defense Fund, IPUC Case #U-1006-124), alleging in part that IPC has failed to protect its power producing water rights in not collecting compensation from irrigators who have removed water from the Snake River. The resolution of this issue could have implications for the proposed action.

Idaho Power Company Electricity Demand

IPC customers are generally divided into five main customer classes: residential, small commercial, large commercial and industrial, irrigation, and sales for resale (sales to other utilities). Appendix 2-11 provides a more detailed breakdown of IPC customers.

Demand for electricity on the IPC system varies seasonally. The system peak occurs in the summer, usually late in June or early July, and is caused principally by irrigation sales. Figure 2-13 illustrates 1977 sales by month for each customer class; Figure 2-14 shows the same for 1978. The top line on each figure represents total sales each month. The areas between the lines represent sales to each customer class. The graphs illustrate the contribution of the irrigation load to the summer peak demand. They are different because in 1977, a drought year, electricity supplies were short and sales to other utilities were limited almost entirely to firm contracts.

Figure 2-15 illustrates the growth in demand the IPC has experienced over the past ten years. The top of the bar represents the summer peak load, while the shaded part represents the difference between the peak and the average load throughout the year. As shown in Figure 2-15, peak demand has been growing at a faster rate than average demand, thus the ratio of summer peak to average demand is increasing.

Matching of Supply and Demand

Idaho Power Company's major problem in terms of matching electricity supply resources with demand occurs in the summer when the peak demand coincides with low streamflows through the hydroelectric system. This problem is illustrated in Figure 2-16. The solid line represents the total of IPC-owned generating resources, both thermal and hydro, by month, assuming median water conditions. The dotted line is IPC's 1978 forecast load, by month. The shaded area between these two lines indicates the summer gap between resources and demand, a gap which the company currently makes up with traded or purchased power. The months in which the demand line falls below the resource line are those months in which IPC exports power to other utilities. With the exception of 1977, IPC has been a net exporter of electricity in each of the last 10 years.

IPC Rate System

A basic feature of the IPC rate system is "average cost pricing." IPC's various power resources (hydro, thermal, and imported) all differ in cost. Under an "average cost" system, the costs of all the resources used are averaged together and then spread out among all IPC customers. One result of this pricing method is that if, for example, as a result of increased industrial growth in the service area a new power plant is built, the cost of the electricity produced at the new plant will be

TABLE 2-19

IPC DAMS AFFECTED BY
DIVERSIONS IN THE ES AREA

<u>Dam</u>	<u>Generation Potential at Dam KWH/Acre Foot</u>
Hells Canyon	179.1
Oxbow	94.4
Brownlee*	137.9 - 242.0
Swan Falls	16.9
C.J. Strike	77.4
Bliss	61.7
Lower Salmon	50.8
Upper Salmon	71.4

*Electricity generated by an acre foot of water at Brownlee Dam varies with the reservoir elevation and the resulting head. Generally during summer months the reservoir is full and the electricity generated by an acre foot is at or near the upper limits.

SOURCE: IPC Answer to Complaints Interrogations Third Set Response 4d,
IPUC case # U-1006-124

averaged in with the cost of electricity produced at all the old plants. From this is arrived a new average price for the entire system. This means that if electricity from the new plant is more expensive than the old system average, all customers will face increased rates to pay for the new generating facility.

The IPC rate system is basically made up of three determinations, each of which must be approved by the Idaho Public Utilities Commission (IPUC). These determinations are 1) the total amount of revenue which the company must collect in order to make a fair profit; 2) the amount of revenue to be collected from each customer class; and 3) the system of rate schedules used to bill customers in each class.

The revenue requirement of the company is based on many factors, such as operating expenses, the company's total investment in generating plants, and the interest charges the company must pay on its investment. A change in any one of those (e.g., an increase in the price of coal, construction of a new plant, etc.,) creates a change in the company's revenue requirement, and thus in customer prices.

Since 1974, the revenue requirements of IPC and the rates charged to customers have been increasing. The main factor has been the addition of IPC's portion of the Jim Bridger coal-fired power plant. For one thing, new plants, both hydro and thermal, have high capital costs; IPC's 500 MW of Jim Bridger had an installed cost of \$338 per kilowatt (KW) compared to an average installed cost of \$192 per KW for the three dams in the T.E. Roach Complex completed in the early 1960's. Total generating costs of thermal plants are also high (12 mils per KWH at Bridger in 1976 compared to 4 mils per KWH at IPC dams).

For any given year, a "system average price" per KWH may be calculated by taking the total revenues collected and dividing by the total number of KWH sold. In 1977 this figure was 16.3 mils per KWH.

All customers, however, do not pay the "system average price." As mentioned before, customers are divided in various classes. In order to determine prices IPC, with the approval of IPUC, distributes its revenue requirement among the various classes of customers, taking a number of factors into account. (For example, IPC may determine that it is less expensive to deliver a KWH to large industrial customers than to residential customers because the large industrial electrical delivery system is more concentrated than the delivery system for residences). Table 2-20 shows the average price for several main categories of customers and the average system price for 1977.

The customer classes are further broken down into one or more "rate schedules", each with a different set of tariffs. Residences, for example, currently pay a fixed monthly customer charge of \$3.50, with an energy charge of 18.4 mils per KWH. Irrigation customers, on the other hand, pay a "demand" charge, depending on the maximum electricity requirement at any given time, plus a KWH hour charge which decreases as more KWH are used for each KW of demand. Therefore, depending on usage patterns, some customers pay more than the average class price per KWH and some pay less (see Appendix 2-11 for greater detail).

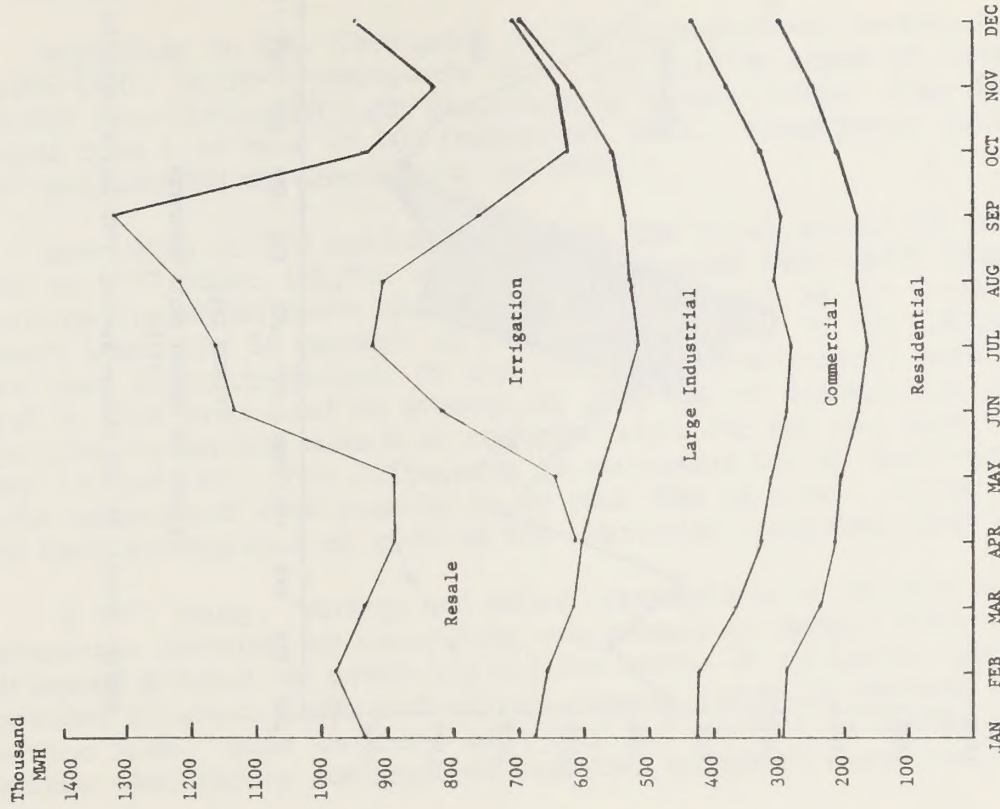


Figure 2-14

IDAHO POWER COMPANY 1978 MONTHLY SALES BY CUSTOMER CLASS

Source: IPC monthly reports to the IPUC for 1978.

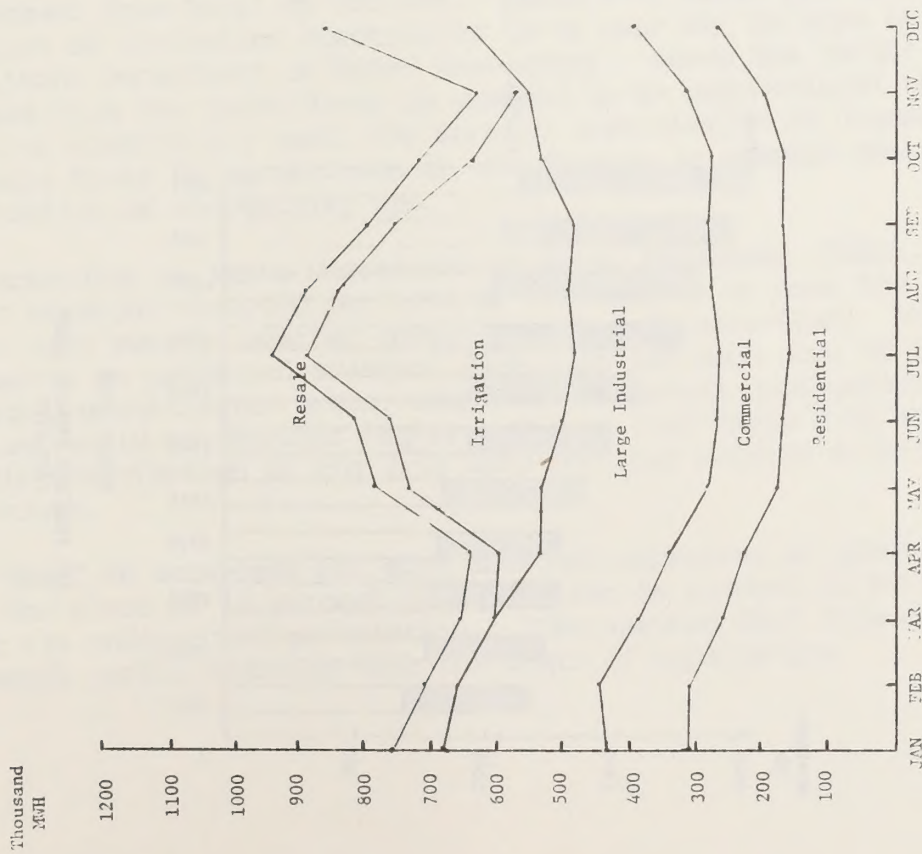


FIGURE 2-13

IDAHO POWER COMPANY 1977 MONTHLY SALES BY CUSTOMER CLASS

Source: IPC monthly reports to the IPUC for 1977.

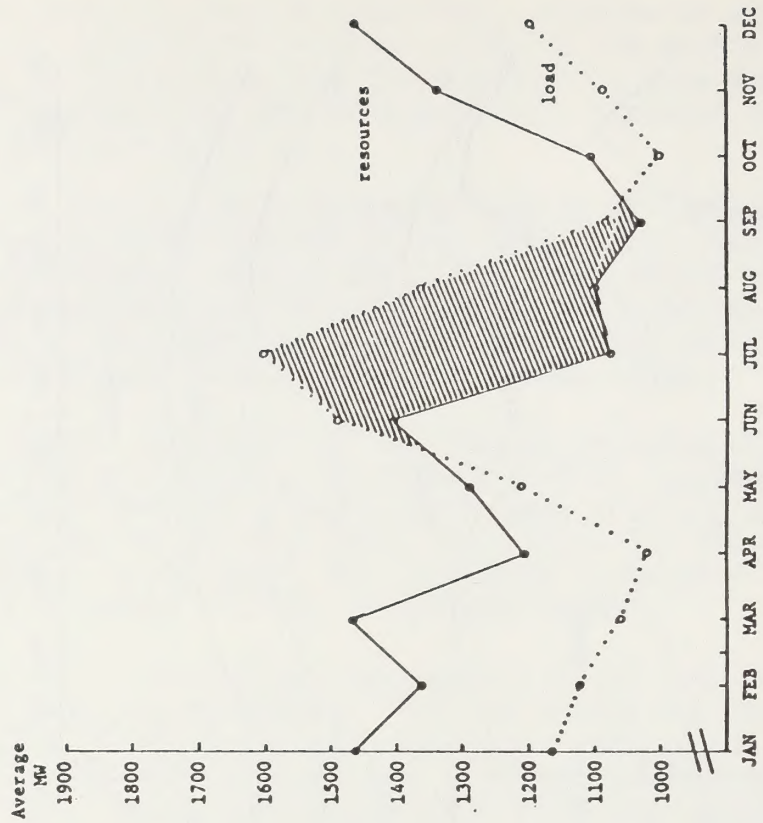


FIGURE 2-16
 IPC LOAD AND COMPANY OWNED RESOURCES
 1978

Source: Exhibit 48 IPC Witness Barclay, IPUC Case # U-1006-140

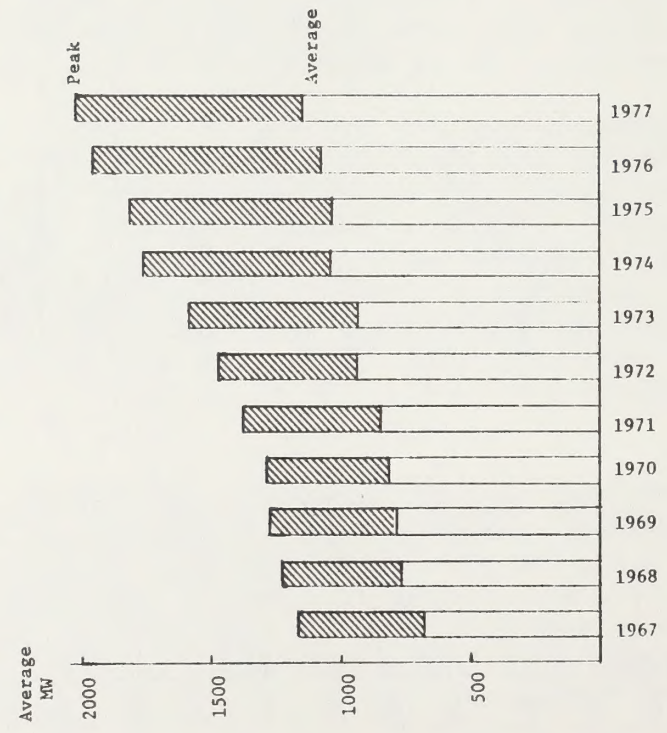


Figure 2-15
 IPC PEAK AND AVERAGE LOADS
 1967-1977

Source: IPC Annual Reports to the Federal Energy Regulatory Commission (FPC Form 1) for the years 1967-1977.

Agricultural Electricity Environment

According to IPC (Testimony of IPC witness James Bruce, IPUC Case # U-1006-140), in 1977 there were about 1.7 million acres of land in their service area irrigated with electrically driven pumps. Pump installations ranged from 1 to over 20,000 horsepower (HP). These pumps consumed about 1.67 million MWH of electricity in 1977.

According to IPC estimates, out of the total amount of irrigated land in 1977 about 162,000 acres were irrigated with water from the same reach of the Snake River (Salmon Falls to Weiser) as the proposed action. Though less than 10 percent of the irrigated land in the IPC area, this land used about 25 percent of the irrigation electricity sold by IPC. Land in this area used an average of 2549 KWH of electricity per acre over the irrigation season as compared with 992 KWH per acre for all IPC pump irrigation. This difference is accounted for by the relatively high lifts associated with pumping in or near the ES area. Lifts of 400 to 600 feet are typical of much of the currently irrigated land in the area.

A 1977 study, "Energy and Water Consumption of Pacific Northwest Irrigation Systems" by Larry King and others at Oregon State University estimated a total of about 3.5 million acres of irrigated land in the portions of south Idaho and eastern Oregon generally covered by the IPC service area. This includes both pump and gravity irrigated land. The average electricity consumption over all irrigated acres was 575 KWH per acre.

In a normal year, 99 percent of the electricity used for irrigation is consumed from April to October. Table 2-21 shows the monthly distribution of irrigation electricity in or near the ES area in an average year (Idaho Department of Water Resources). Since the amount of water diverted from the Snake River is assumed to be proportional to the amount of electricity used, the monthly distribution of diversions from the Snake River by agriculture in the ES area is exactly the same as the distribution of electricity use.

According to Idaho Department of Water Resources (IDWR), the total amount of water diverted per acre of farmland in or near the ES area in a year with average weather conditions is 2.58 acre-feet. This number represents an estimated seasonal diversion for each acre of farmland, including uncultivated areas; and thus the actual application of water to cropland would be somewhat higher. Column 2 of Table 2-21 shows the monthly distribution of the 2.58 acre-feet per acre in acre-feet diverted each month.

The 2.58 acre-feet per acre does not represent an absolute diversion from the river as 15 percent of this water is assumed to return to the river via underground percolation. IDWR assumes that this occurs over a ten-month period starting with the month of application.

TABLE 2-20

AVERAGE PRICE FOR
SELECTED CUSTOMER CLASSES, 1977

	<u>Mills/KWH</u>
Residential	20.7
Irrigation	16.0
Large Commercial	12.5
Industrial Special Contracts*	8.3
Commercial - Small**	23.3
Public Street Lighting	45.0
Sales to Other Utilities	11.6
Average System Price	16.3

* Special Contracts between IPC and six very large industrial customers.

**In TABLE 2-4 & 5, Small Commercial and Street Lighting are combined, and Large Commercial and Industrial Special Contracts are combined.

SOURCE: IPC, FPC Form 1, for the year 1977

TABLE 2-21

MONTHLY DISTRIBUTION OF ELECTRICITY FOR
PUMPING & WATER DIVERSIONS IN THE STUDY AREA

	<u>Percent per Month (Electricity and Water)</u>	<u>Acres-Feet per Month (Water Only)</u>
April	4	.10
May	10	.26
June	23	.59
July	27	.70
August	21	.54
September	12	.31
October	<u>3</u>	<u>.08</u>
TOTAL	100%	2.58

SOURCE: Idaho Department of Water Resources

Pacific Northwest Electricity Environment

IPC is a member of the Northwest Power Pool, an organization of utilities in the region, including the Bonneville Power Administration (BPA). As a result of its membership in the pool, IPC is a party to a number of regional power supply agreements. IPC also has purchase, trade, and transmission agreements with other northwest utilities and the BPA. In this section, therefore, the ES area will be considered as a part of the larger energy environment of the whole Pacific Northwest.

About half the power produced in the northwest comes from the Federal Columbia River Power System (FCRPS). The FCRPS consists of 29 federally built dams on the Columbia and its tributaries operated by the Army Corps of Engineers or Bureau of Reclamation. BPA markets and transmits the power generated by these dams, as well as part of the output of four other facilities--two hydro, two nuclear, and one coal. (For the dams which are operated by the Bureau of Reclamation, some of the output is reserved for use at Bureau of Reclamation irrigation projects.)

Of the 29 FCRPS dams, eight are fed wholly or partially by the Snake River, a major tributary of the Columbia River. On the average these dams are capable of generating about .87 KWH per foot of head for each acre-foot of water which passes through the turbines. Thus, a dam with a 100-foot head can produce $100 \times .87 = 87$ KWH per acre-foot of water. The eight dams are listed in Table 2-22 along with the KWH per acre-foot value for each dam. The total of 617.7 KWH per acre-foot represents the electricity generated by one acre-foot of water passing through the turbines of the eight FCRPS dams fed by the Snake River.

Existing diversions from the Snake River in Idaho have an effect on the generating capability of these FCRPS dams. In the past some of the water diverted might have been spilled, i.e., not run through the turbines because of lack of markets or too much water. However, in the future, it may be assumed that all diversions would have been usable at these dams since the market for Northwest power is expanding rapidly and since peaking units are being added to some of the dams to take advantage of high flows.

The Bonneville Power Administration markets electricity to 115 public agencies, several state and federal agencies, and 17 direct service industrial customers in the Pacific Northwest (PNW). In addition to these sales, BPA sells electricity to California through a variety of contractual arrangements. Generally these sales are the highest in the spring and summer months, used to displace more expensive electricity generated at oil and natural gas fired power plants.

Chemical Energy Environment

Energy is consumed by agriculture in the ES area not only in the form of electricity for pumping but also in a variety of chemical forms.

Chemical energy consumption may be thought of as either direct or indirect. Direct consumption consist mostly of diesel or gasoline use by farm vehicles and machinery. Indirect consumption includes the energy used in the raw materials, manufacturing, and transportation of energy for fertilizers, insecticides and herbicides.

Table 2-23 gives rough estimates of quantities of chemical inputs for five crops commonly grown in or near the ES area.

Current yearly statewide consumption levels for all uses are approximately as follows: gasoline--521 million gallons per year (Idaho State Tax Commission Figure for 1977-1978 Fiscal year); diesel--316 million gallons per year (Bonner and Moore Associates 1978); all Fertilizers--565,793 tons per year (Idaho Department of Agriculture 1977); and all pesticides (agricultural use only) - 3,067 tons per year (Federal Energy Administration 1977).

TABLE 2-22
FCRPS DAMS FED BY THE SNAKE RIVER

	<u>KWH/Acre Foot</u>
Lower Granite	85.3
Little Goose	85.3
Lower Monumental	87.0
Ice Harbor	85.3
McNary	64.4
John Day	87.0
The Dalles	72.2
Bonneville	<u>51.3</u>
TOTAL	617.7

SOURCE: "Energy and the Growth of Irrigated Agriculture in South Idaho," Agricultural Economics Research Paper #AER 210, by Joel Hamilton, Department of Agriculture, University of Idaho.

TABLE 2-23
ESTIMATED CHEMICAL ENERGY INPUTS
FOR FIVE CROPS

<u>Chemical Inputs</u>	<u>Potatoes</u>	<u>Grain</u>	<u>Beets</u>	<u>Beans</u>	<u>Alfalfa</u>
Gasoline (Gal/Acre)	17.0	3.2	11.9	11.8	3.0
Diesel (Gal/Acre)	54.0	2.3	10.1	26.5	5.0
Nitrogen (lb/Acre)	240.0	80.0	200.0	40.0	-
Phosphate (lb/Acre)	120.0	-	100.0	100.0	80.0
Potassium (lb/Acre)	100.0	-	80.0	-	-
Insecticide (lb/Acre)	2.5	-	1.0	-	-
Herbicide (lb/Acre)	4.0	4.0	3.0	1.0	1.0

Sources: Gasoline use per acre: Federal Energy Administration.
Fertilizer, pesticide applications: Idaho Department of Water Resources.

FUTURE ENVIRONMENT

This section describes the resources, land uses and socio-economic features that would probably be found in the ES area in about 20 years (2000) without implementation of the proposed action as described in Chapter 1.

No significant changes from the current conditions would be expected in climate, air quality, geology and topography, visual resources, transportation networks, and soils.

WATER RESOURCES

Water Supply

Available water supplies in the Snake River Basin are being subjected to increasing demands for several major water uses. The major uses would be consumptive uses for irrigation and nonconsumptive uses for stream resource maintenance flows for fish, wildlife, power generation, and recreation. Easily attainable and inexpensive water would not be available to satisfy a majority of the competitive or conflicting demands.

Potential changes in management practices for storage systems on the Snake River would be studied (Idaho State Water Plan-Part II). It is probable that low-head hydroelectric dams would be constructed at Dike and Wiley sites as mentioned in Chapter 1. It is possible that an extensive diversion scheme would be constructed which would take spring flows of the Snake River through the Bruneau Plateau Water Development Project to storage impoundments near Grindstone Butte (Saylor Creek and Deadman Creek drainages) for delivery to land during the irrigation season. These impoundments would hold a total of 446,000 acre-feet of water. This proposal would drastically reduce energy costs since high-lift pumping would be eliminated. Most public land projected for development under the proposed action within the Saylor Creek unit (about 81,000 acres) could probably be irrigated by this project. About 51,500 acres of existing farmland relying on high-lift pumping could also be irrigated by this canal.

The flows of the Snake River in the year 2000 would be considerably less in the ES area than at present. Spring runoff would be captured in average flow years at Milner Dam and transported to off-stream storage reservoirs. Summer flows would be considerably less than at present as objectives of the State Water Plan are actively pursued by state agencies and private interests. The State Water Plan calls for 498,000 acres in the Upper Snake River Basin and 292,000 acres in southwestern Idaho and 60,000 acres in the lower Snake to be irrigated by the year 2020 in addition to acreages irrigated in 1975. This would require about 1.7 million acre-feet annually (Water Resources Board 1976). The additional 292,000 acres would require a diversion in the ES area of about 2600

CFS of water at the highest month (probably July). Insufficient water is available in summer to satisfy this demand plus the recommended minimum flow in the Snake for in-stream uses. Idaho Fish and Game Department research has resulted in recommended stream resource maintenance flows of over 4200 CFS above C.J. Strike Pool, 5000 CFS between C.J. Strike Pool and Swan Falls Pool, 5500 CFS from Swan Falls to Bernard's Ferry, and 5100 CFS to the Boise River mouth (Cochner, 1977). In 1977, although the mean flows at all points exceeded these recommendations, low flow at Swan Falls was less than the recommended 5500 CFS on 16 days in June and July.

The Idaho Water Resources Board has prepared "protected flow" recommendations for the Snake River. These are considerably below the flows recommended by the Idaho Fish and Game Department. Water Resources Board "protected" minimum average daily flows (Water Resources Board 1976) are Murphy, 3300 CFS; and Weiser, 4750 CFS.

If put to use, permits already on file would reduce flows to the Murphy minimum average daily flow of 3300 CFS. In exceptionally dry years, flows at Murphy and Weiser would be considerably below the Water Resources Board "protected flows." For example, 1977 low daily flows would have been about 2400 CFS at Murphy in June and July. The State Water Plan notes that federally-licensed projects in Hells Canyon are to operate with certain navigation and power restrictions. The Water Resources Board minimum average daily flows would apparently meet these requirements (Water Resources Board 1976).

The canal diversion of water to reservoirs near Grindstone Butte, designed to capture and store spring freshets, would augment the water supplies available for irrigation and relieve some pressure on the Snake River in average and high-flow years. In low-flow years there may be insufficient freshet waters available at Milner Dam to fill the storage reservoirs.

More demand for non-consumptive water use would probably occur. Opposition to water diversion from the river would increase because of greater demands on fish, wildlife, energy, and recreation resources.

Water Quality

Snake River

The following future environment description of water quality is based on the future environment setting described in the previous Water Resources section. This includes the addition of the two hydropower dams, Dike and Wiley, to the Snake River in the ES area and the implementation of the State Water Plan (Part 2) further reducing Snake River flows.

The supply of one million additional acres of land with irrigation water would result in a pronounced change to the Snake River. This is

assuming that surface return flows from new land would be negligible since all new water would be applied by sprinkler. Assuming the State Water Plan is implemented, suspended sediments and turbidity would decrease slightly (roughly 5 to 7 percent in the ES area). Turbid waters (approximately 25 percent of the existing average summer flow) would be removed from the river for irrigation of which a fraction (about 15 percent) would be delivered back to the Snake River as clear subsurface flows.

Pesticides, herbicides, phosphates, and heavy metals would likewise decrease slightly. Dissolved loading of salts and nitrates would moderately increase in the Snake River. With secondary treatment of point sources and absence of additional surface return flows, fecal, total coliform, fecal striptococci, and Sphaerotilus bacteria should all meet A-2 standards. Oxygen is expected to remain at or near present levels in the ES area.

The percentage of fine sediments in the Snake River would decline slightly, thereby enhancing the benthic invertebrate production capability, both in terms of total live weight and in composition of forms desirable for game fish.

Groundwater

There would probably be continuous groundwater irrigation in the Bruneau-Murphy area as new farmland is periodically developed. Based on present observations, groundwater levels would continue to drop as much as 2 feet per year (USGS, Water Resources Data for Idaho, 1977).

Groundwater quality would not appreciably change in the future. Because of depth from the surface, the Snake River aquifer would not noticeably change in water quality. The majority of the water applied to the land surface would not find its way back to the aquifer. Perched groundwater in sedimentary systems would increase in nitrates, total dissolved solids, and occasionally in toxicants. With ever-increasing irrigation costs, it can be assumed that irrigation systems would be operated at very high efficiencies. Little water would be applied in excess of crop consumption and evapotranspiration needs.

Water from occasional and unpredictable accidents would flow overland along with associated sediments, adsorbed phosphates, heavy metals, and pesticides to tributaries and the main Snake River. Intense summer storms would have the same effect. As more land is cultivated, more bare soil would be exposed to wind action, increasing wind-borne sediment delivery to water courses.

VEGETATION

Terrestrial and Riparian

Grazing environmental statements addressing livestock grazing on the public rangeland within the ES area are scheduled for completion by 1986. As a result, management plans would be implemented to better regulate

livestock and reduce overgrazing. Terrestrial and riparian vegetation studies would be conducted, and range improvement practices would be employed. Management goals would be to alter species composition toward a decrease in sagebrush and annual grasses and an increase in perennial grasses, and desirable shrubs and forbs. With proper management the overall condition of terrestrial and riparian vegetation would improve by the year 2000. Vegetation would be managed under a multiple use concept, thereby benefitting livestock, wildlife, recreation, and other resources.

Aquatic

Dissolved loading of plant nutrients would moderately increase in the Snake River. Without additional high inputs of sediments and associated turbidity to control light penetration, algal blooms would increase slightly, especially in low flows at which time blooms would be especially high in and below areas of settling, ie., the upper half of C.J. Strike Pool, Swan Falls Reservoir, and upper Brownlee Pool. With increased irrigation, the slightly increased productivity of Snake River water and reduced depths would slightly increase algal growth through C.J. Strike and slightly increase algal abundance as far as Brownlee Pool. Attached benthic algae would increase modestly throughout the flowing river reaches. Rooted aquatic plants would increase moderately from Salmon Falls Creek into C.J. Strike Reservoir and slightly increase below C.J. Strike to Brownlee Pool. In terms of plant growth, the Snake River would continue to become increasingly phosphorus-limited as all point sources of pollution come under some form of secondary waste treatment.

Threatened and Endangered Plants

The BLM will continue to conduct inventories to determine the presence of threatened or endangered plants. In an effort to comply with the intent and spirit of the Endangered Species Act of 1973, every step necessary will be taken to protect and preserve these plants.

WILDLIFE

Terrestrial

Based on past non-agricultural environmental changes that have occurred in the ES area, little significant change to existing native wildlife species is anticipated by the year 2000.

Wildfires would continue to be a constant threat to the existing habitat. It is anticipated an average of approximately 15,000 acres would burn each year. This would alter some areas that presently have a shrub/grassland vegetation type to a reseeded grassland type. This change in habitat type would be followed by a change in wildlife species composition in these areas. Many of the fires would reburn areas that are already predominately grassland type but would not change the habitat type.

The improvement of roads would increase visitor use in the area. This would increase the amount of human disturbance to wildlife and would also put more pressure on wildlife as many visitors are consumptive users of wildlife.

Increased ORV use could be expected as human populations increase in the ES area. This would have some disruptive impacts upon wildlife, especially those species which use the area in the spring.

Because of the BLM's isolated tracts program, habitat condition of the isolated tracts can be expected to improve. Nesting and cover opportunities for those wildlife species that inhabit agricultural areas would probably improve.

It is anticipated that new water storage reservoirs might be constructed in selected drainages in the ES area. These reservoirs would provide water for cropland in the ES area. They would also create new wildlife habitat, thereby aiding species which are attracted to aquatic habitats.

Fisheries

The following future environment description of fisheries is based on the future environment setting described in the previous Water Resources Future Environment section of this ES. This includes the addition of the two hydropower dams, Dike and Wiley, to the Snake River in the ES area and implementation of the State Water Plan (Part 2), further reducing Snake River flows.

Sturgeon

Flow reductions of the magnitude anticipated would sharply reduce sturgeon habitat and abundance. This species is not found in rivers with small flow volumes, such as the Boise, Payette, or Weiser. Reducing the size of the Snake River by half or more in summer, to a mean of 3300 CFS in average years and less in low flow years, would reduce the quality of the Snake River for sturgeon habitat. Spring freshets would be eliminated in all but high-flow years by diversions at Milner, further changing the character of the river. The river would become clearer as slightly more of the flow is contributed by return-flow groundwater. These conditions would tend to slightly reduce the total quantity of carrion moving along the stream bottom as more of the available fish populations, other than sturgeon, would be consumed by predators such as squawfish and trout. This would leave a smaller proportion of annual production to die. Ultimately, there would be less food for scavenger fishes.

Dike and Wiley Dams would eliminate 20 percent of the sturgeon habitat remaining between C.J. Strike Pool and Shoshone Falls. The Dike/Wiley reach has been termed "the best sturgeon habitat and sturgeon populations in the Magic Valley" (Bob Bell, Idaho Fish and Game Biologist,

Jerome, personal conversation and a letter from Idaho Fish and Game Department to the PUC dated 14 June 1978). This reach is also the best sturgeon habitat in the Snake River at this time since dams in Hells Canyon have eliminated or degraded large habitat areas.

Some food for sturgeon would be produced directly below the turbines at Dike and Wiley Dams as fish from the pools upstream are damaged or killed in passage through the turbines. This type of food increment can be seen below most hydropower facilities at various times during the year.

No chronic toxicity or water quality problems are anticipated in the future environment which would reduce sturgeon stocks. Serious pollution accidents have a greater probability of occurring as human activity increases. Accidental spills of heavy metals or pesticides are more likely with more development. No limiting problems to sturgeon due to growth of algae or other plants are anticipated.

Other Fishes

Flow reductions of the magnitude anticipated would reduce habitat for all fish species markedly. Flow changes in late spring and early summer would kill incubating embryos of smallmouth bass, channel catfish, and black crappie. The river channel would be dewatered to the point that available spawning areas would be seriously reduced and competition for them increased. Fish growth would be reduced as fish become more concentrated in residual flows. Food-producing areas would be lost and more pressure would be placed on remaining food supplies. Substantial decreases would occur in the total habitat available to benthic invertebrates such as snails and freshwater mussels. Benthic invertebrates are valuable food sources for game fish. Substantial numbers of young fish would probably be entrained in irrigation pump intakes and lost in water delivery systems. Interactions for available cover would be more severe as the wetted stream margin moves away from riparian vegetation.

There would be no barriers to fish migrations or local movement as long as summer flows remain above 2000 CFS. Reservoir populations would not be affected materially by the flow reductions if the present hydropower management regime continues.

Predatory fishes would benefit slightly from the concentration of flow and very slightly improved clarity.

Existing trends which would continue are an increase in presence of rainbow trout and coho salmon in tailwaters, a shift, especially in C.J. Strike Pool, toward smallmouth bass and channel catfish, and a shift away from largemouth bass and black crappie. Fish populations in Dike and Wiley pools would likely be much the same as those in Bliss pool. These would include smallmouth bass, channel catfish, and local concentrations of trout, especially in tailraces.

Fisheries Downriver of the ES Area

An environmental review by the Corps of Engineers (USACE 1976) indicates that by the year 2020 irrigation withdrawals from the Snake and Columbia Rivers would severely impact resident game fish, water quality, and recreation in the lower Snake and Columbia Rivers under the probable conditions of flow. The study did not address anadromous fish problems, but it is clear that salmon and steelhead runs would be significantly damaged by the projected reductions in flow, of which Idaho withdrawals would be a part. The Columbia Fishery Management Council (1979) predicts that long-term flow reductions combined with peaking will seriously impact the already precarious situation for anadromous fish in the Snake and Columbia Rivers. The report notes that supplemental storage, earmarked for fishery purposes, is desirable.

WILD HORSES

Owyhee Herd

The Owyhee wild horse herd would continue to be protected and managed as intended in the present Wild Horse Management Plan under a multiple use system in conjunction with livestock grazing, wildlife management, recreation, and other uses of public land. It is expected that the range will remain the same as that shown on Map 2-7, and that herd size will continue to be between 47 to 74 horses.

Saylor Creek Herd

Under the WHMP (scheduled for completion in 1984) the Saylor Creek herd would be protected and managed in accordance with the multiple use concept. An optimum herd size of approximately 25 head (based upon present management objectives) would be maintained, and range sufficient to support the herd and meet habitat requirements would be designated. Watering facilities and range improvements would be installed if necessary. Management practices and monitoring programs would be developed to insure proper herd protection and management.

CULTURAL RESOURCES

Prehistoric Resources

In the year 2000, vandalism, cattle trampling, off-road vehicle use, and weathering processes would continue to be the major factors contributing to the loss of prehistoric resources. Cultural resource inventories completed as part of the required range environmental statements for all of southwestern Idaho would provide more data on the nature of sites and their distribution in the ES area. Federal agencies would continue to evaluate all proposed projects and actions for impacts on cultural resources prior to their implementation, thus minimizing the loss of scientific data.

Historic Resources

Historic resources would deteriorate to some degree by the year 2000 simply due to ongoing natural processes such as weathering and erosion. In addition, vandalism and livestock related impacts in grazing areas are expected to continue. Significant historic structures may receive restoration benefits from other federal or state agencies. Enforcement of cultural resource protection laws would continue to be difficult. The BLM would continue to follow directives requiring inventory, evaluation, and consultation with the National Advisory Council on Historic Preservation.

Paleontological Resources

Paleontological resources in the ES area would probably not be substantially better known in the year 2000 than they are at present. Unless protective legislation is clarified and enforced, indiscriminant collecting and destruction through the activities of man would eliminate a portion of this data base.

RECREATION

Significant increases in outdoor recreation use are expected along with population growth and a trend towards more leisure time.

Specific increased recreational use for historic and paleontological sightseeing would be expected to increase at the proposed Hagerman Fauna Sites National Monument and the designated Oregon National Historic Trail.

Some recreational use, such as fishing and nature study would occur at the Dike and Wiley Dam sites which are proposed for construction in the near future. Access and recreation facilities at the dam sites would accommodate the increase in visitor use. Sturgeon fishing in this area, however, would significantly decrease corresponding to habitat loss, and the impoundments would eliminate float boating use.

ORV use would increase through the area since motorcycling is among the fastest growing activities. According to the Off Road Vehicle Recreation Plan (Idaho Department of Parks and Recreation), motorcycle use is expected to increase 130 percent by the year 2000.

Uncontrolled recreational use could adversely affect the existing environment. The most severe impact would be from the off road vehicle activity. Increases in fishing, hunting, camping, and picnicking would also degrade undeveloped recreation sites, especially along the Snake River and adjacent to reservoirs.

WILDERNESS

Three areas that lie at least partially within the ES area have been designated as Wilderness Study Areas. If by the year 2000 wilderness is established within the ES area, wilderness characteristics would be expected to deteriorate slightly due to increased recreational use.

LIVESTOCK GRAZING

Grazing environmental statements are scheduled to be written for all public grazing land within the BLM Boise District. These statements would propose to initiate intensive livestock grazing management programs on an allotment-by-allotment basis. Scheduled completion dates of statements for those planning units within the ES area are Owyhee, 1980; Bruneau, 1982; and Saylor Creek and Bennett Mountain, 1984.

Prior to writing each of these environmental statements, extensive resource inventories would be conducted. Included would be a vegetation inventory to determine current and potential forage production from which existing livestock carrying capacities and stocking rates could be updated. With data obtained from these inventories, allotment management plans (AMPs) would be written, and would form the basis for future livestock management programs.

With intensive livestock grazing management under AMPs, by the year 2000 there would be an improvement in forage condition, forage availability, vegetation production, and vegetation condition. This would lead to overall range improvement of the grazing land within the ES area. With intensive management and range improvements, by the year 2000 there should be an increase in the amount of forage available, leading to an increase in stocking rates above what it was at the time the AMPs were first implemented.

Until the time the grazing ESs are approved and the AMPs are implemented, livestock grazing in the ES area is expected to be much the same as it is described in Chapter 2, Description of the Existing Environment.

MINERALS

Production of common variety minerals can be expected to remain relatively stable, depending on annual market demand for those materials. Barring any major oil or gas discoveries or advancements in geothermal engineering technology, future activity with respect to those resources would be confined to leasing with no major production. In the past few years, several geothermal test wells have been drilled in the Castle Creek area. As leases reach maturity, it seems quite probable that further testing of the Bruneau-Grandview aquifer will be done.

LAND USE PLANS, CONTROLS, AND CONSTRAINTS

Comprehensive land use planning by the counties in the ES area is beginning but no zoning or other constraints have been developed to enforce the recommendations in the existing plans. Based on this performance and the response of more highly populated counties to land use planning, few restrictions and little direction will be provided through county land use plans. BLM planning efforts would guide the use of public land in the counties and determine future public purpose projects, location of utility corridors, or other intensive land uses.

SOCIO-ECONOMIC CONDITIONS

Projected Total Population

It is estimated that by the year 2000, the three counties in the ES area would have a population of approximately 116,000. This is 8.5 percent of the state's projected year 2000 population figure of 1,363,970 (see Appendix 2-12).

Twin Falls County would experience the fastest growth rate, and Owyhee County would be the slowest growing county in the ES area. Table 2-24 illustrates projected population figures for the three counties and for the state, and shows the estimated annual growth rates.

TABLE 2-24

PROJECTED POPULATION - 2000

County	Population	Annual Growth
Elmore	27,564	1.4%
Owyhee	8,737	0.8%
Twin Falls	<u>79,990</u>	2.2%
TOTAL	116,291	
State	1,363,970	2.2%
Canyon	116,760	2.2%

SOURCE: Meale, Robin and Jack Weeks. 1978. Population and Employment Forecast-State of Idaho, Series 2-Projections 1975-2000. Department of Water Resources and Boise State University Center for Research, Grants, and Contracts, Boise, Idaho.

Projected Employment by Major Economic Sector

Agriculture employment would decrease in the ES area through the year 2000, but this activity would be picked up by manufacturing, services and miscellaneous, and wholesale and retail trade.

Agriculture would still be the most active sector in Owyhee County, while wholesale and retail trade in Elmore and Twin Falls Counties represent approximately 30 percent of those who would be employed by 2000.

Elmore County would still display a high participation rate in the Federal government sector. This increase is attributed to the location of the air base in the county.

Table 2-25 offers an employment forecast for the three county area and for the state.

TABLE 2-25
EMPLOYMENT FORECAST 2000

	Three County Area	State		Three County Area	State
Agriculture	3,721	25,766	Wholesale, Retail, & Trade	15,059	152,258
Mining	105	4,880			
Construction	3,125	38,059	Finance, Ins., & Real Estate	2,227	30,056
Food & Kindred	4,013	29,402	Services & Misc	5,004	109,554
Wood Products	536	35,683	State & Local Govt.	4,893	86,009
Other Mfg.	4,857	45,445	Federal Government	1,932	15,726
Trans., Comm., & Utilities	2,996	33,069			

SOURCE: Meale, Robin and Jack Weeks. 1978. Population and Employment Forecast-State of Idaho Series 2-Projections 1975-2000. Department of Water Resources and Boise State University Center for Research, Grants, and Contracts, Boise, Idaho.

Projected Unemployment Rate

An attempt was made to project unemployment rates to the year 1982 (see Table 2-26). Linear regression was used based on 1970-1977 historical unemployment information. Because participation in the labor force is a function of inflation, money reserves, governmental actions, etc., the figures presented are estimates at best. Overall, it is assumed that unemployment rates would not significantly change over the next 20 years. The rates presented are not seasonally adjusted.

TABLE 2-26

Annual Unadjusted 1980 - 1982

Year	Elmore	Owyhee	Twin Falls	Canyon
1980	8.44	6.04	6.75	6.69
1981	8.83	6.16	6.97	6.90
1982	9.22	6.28	7.19	7.12

Projected Earnings by Major Economic Sector

A growth rate (displayed in Appendix 2-12) from 1975 to 2000 was established for each major economic sector and applied to current estimates of earnings. Table 2-27 illustrates projected earnings in 1975 dollars by major economic sector estimates by the year 2000. One important aspect to note in this table is that agriculture is in a state of decline.

TABLE 2-27

PROJECTED EARNINGS BY MAJOR ECONOMIC SECTOR

2000

(Thousands of Dollars)

	Elmore	Owyhee	Twin Falls	Three County Area	Canyon
Agriculture	5,747	3,145	31,622	39,679	23,303
Food Processing	---	---	---	---	---
Wood Products	---	---	---	---	---
Other Manufacturing	---	---	419,136	484,418	---
Construction	7,094	4,982	40,033	51,902	41,151
Mining	---	---	---	---	---
Trans., Comm., & Utilities	9,544	552	34,486	1,039	39,380
Wholesale & Retail Trade	14,589	4,531	123,186	42,778	111,670
Finance, Ins., & Real Estate	4,424	459	21,127	141,803	13,918
Services and Misc.	4,233	2,813	53,525	61,107	108,234
Government	98,017	2,960	32,820	116,895	47,038
ALL SECTORS	147,523	18,167	439,502	601,497	520,034

Projected Per Capita Revenues and Expenditures:

Table 2-28 illustrates projected revenues and expenditures on a per capita basis for local services by the year 2000. Average population growth rates, derived from the ES area counties, were calculated and applied to current estimates of per capita revenues and expenditures. The growth rates are .014 percent for Elmore County; .008 percent for Owyhee County; and .022 percent for Twin Falls County. Canyon County has a growth rate of .022 percent. It is assumed that as population growth occurs during the 1975-2000 period, so would the need increase for local services, funding, and taxation.

TABLE 2-28
 PROJECTED PER CAPITA REVENUES AND EXPENDITURES
 2000
 (In Rounded Figures)

	ELMORE		OWYHEE		TWIN FALLS		CANYON	
	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.	Rev.	Exp.
Property Tax	193		243		296		293	
Education Transfers	218		232		222		253	
Revenue Sharing	14		22		19		38	
Highway Transfers	40		57		64		36	
School Costs		95		137		114		146
Street and Highway Costs		17		26		28		22
Solid Waste Costs		2		9		2		4
Cemetery, Fire, Irrigation Drainage, Etc.		1		6		3		6
Water Distribution Costs		-0-		.43		.26		-0-
Local Government Functions								
Cities		34		13		69		60
County		45		61		60		60

See Appendix 2-12 for explanation of applying growth rates.

Social Values

It is anticipated that future sociological conditions would change little from the existing situation as described in Chapter 2, Existing Environment.

Agricultural sector employment would decrease in the future. As a result, the importance of farm related organizations would diminish in proportion to the decline in employment.

ENERGY

A single definitive analysis of the future energy environment in south Idaho without the proposed action is not possible. A number of forecasts have been made, and they vary widely. There is no "right" forecast since the future energy environment depends heavily on a number of policy decisions which cannot be predicted with accuracy. In this section, a summary of various forecasts will be made to illustrate the range of current projections.

Electrical Energy

Forecasts of the future electricity environment can be divided into demand forecasts, and supply and cost forecasts.

Demand Forecasts

There have been a number of recent electricity demand forecasts for the IPC area made in connection with the IPC proposal to construct a major coal-fired power plant in south Idaho. These forecasts vary widely.

Figure 2-17 shows a range of forecasts for IPC total sales, including firm resale, through 1990. They include forecasts by IPC made in 1977 by the Arthur D. Little Company (marked ADL "High" and ADL "Low"); by Dr. Don Reading, Professor of Economics at Idaho State University; and by the IPUC staff. Professor Reading's study is basically a modification of the IPC study, using population predictions made by the Bonneville Power Administration. The IPUC staff made forecasts based on modifications of the IPC and ADL forecasts. The IPUC staff forecast presented in Figure 2-17 is a modification of the ADL forecast using population estimates of the Idaho Department of Water Resources (IDWR).

As can be seen from the graph, all forecasts predict an increasing demand for electricity over the next ten years.

Separate forecasts for future irrigation demand were made by IPC, Professor Reading, and ADL. These forecasts are illustrated in Figure 2-18. The IPC forecast contains an assumption of 20,000 acres of new

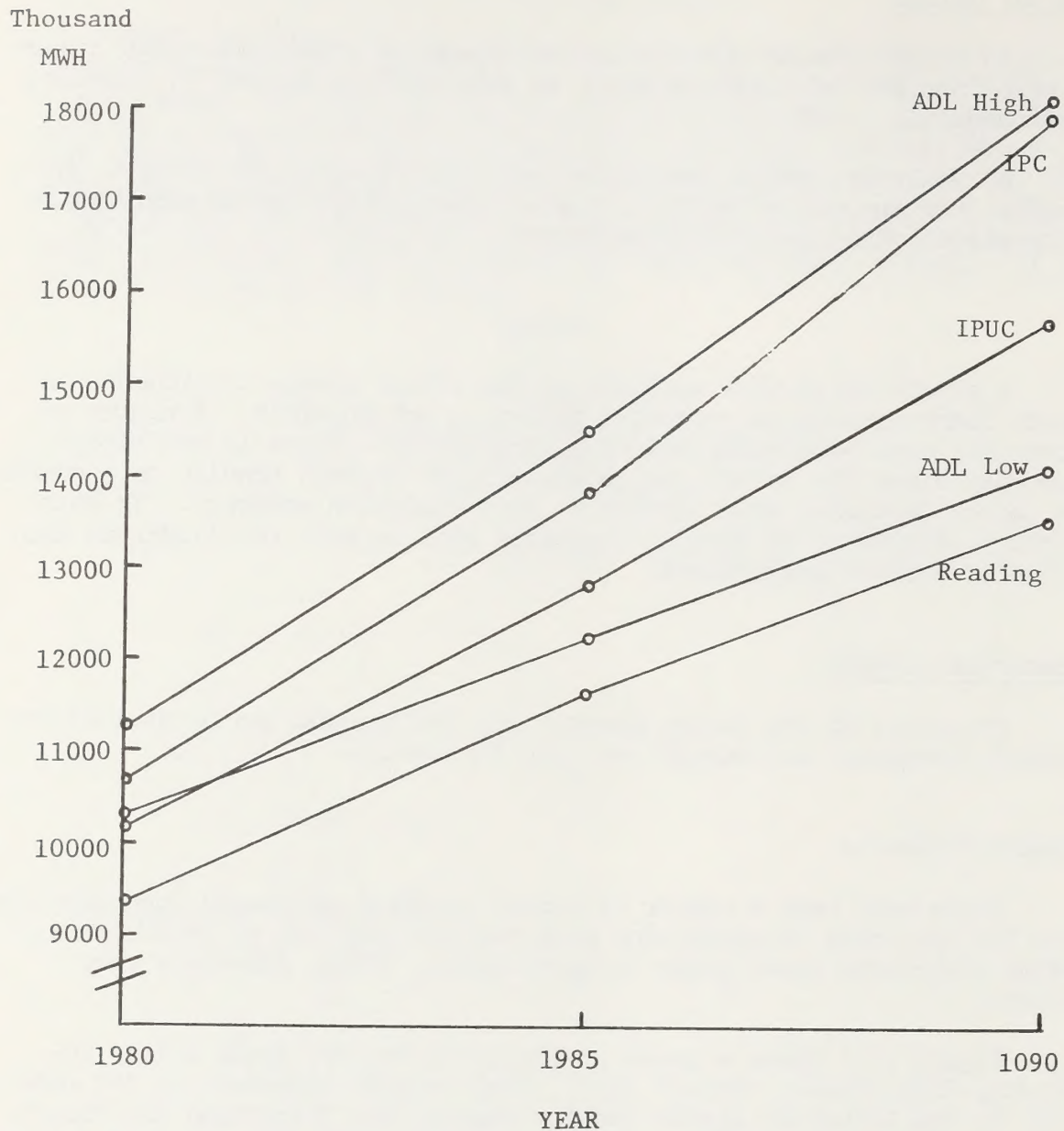


Figure 2-17

FORECASTS IPC GENERAL BUSINESS SALES*
1980-1990

Sources: IPC forecast: exhibits of IPC Witness Barclay, IPUC Case # U-1006-137; Reading forecast: exhibits of Citizens for Alternatives to Coal Power Witness Reading IPUC Case #U-1006-137; IPUC staff forecast: exhibits of IPUC Witnesses Winterfield and Wilmourth IPUC Case #U-1006-137. Arthur D. Little Co. forecast: "Idaho Power Company's Need for Additional Generating Capacity," Final Report to the IPUC by Arthur D. Little Co., February 1976.

* Includes Service Area Sales plus firm sales for resale to California Pacific Utilities, Weiser and Nevada Power.

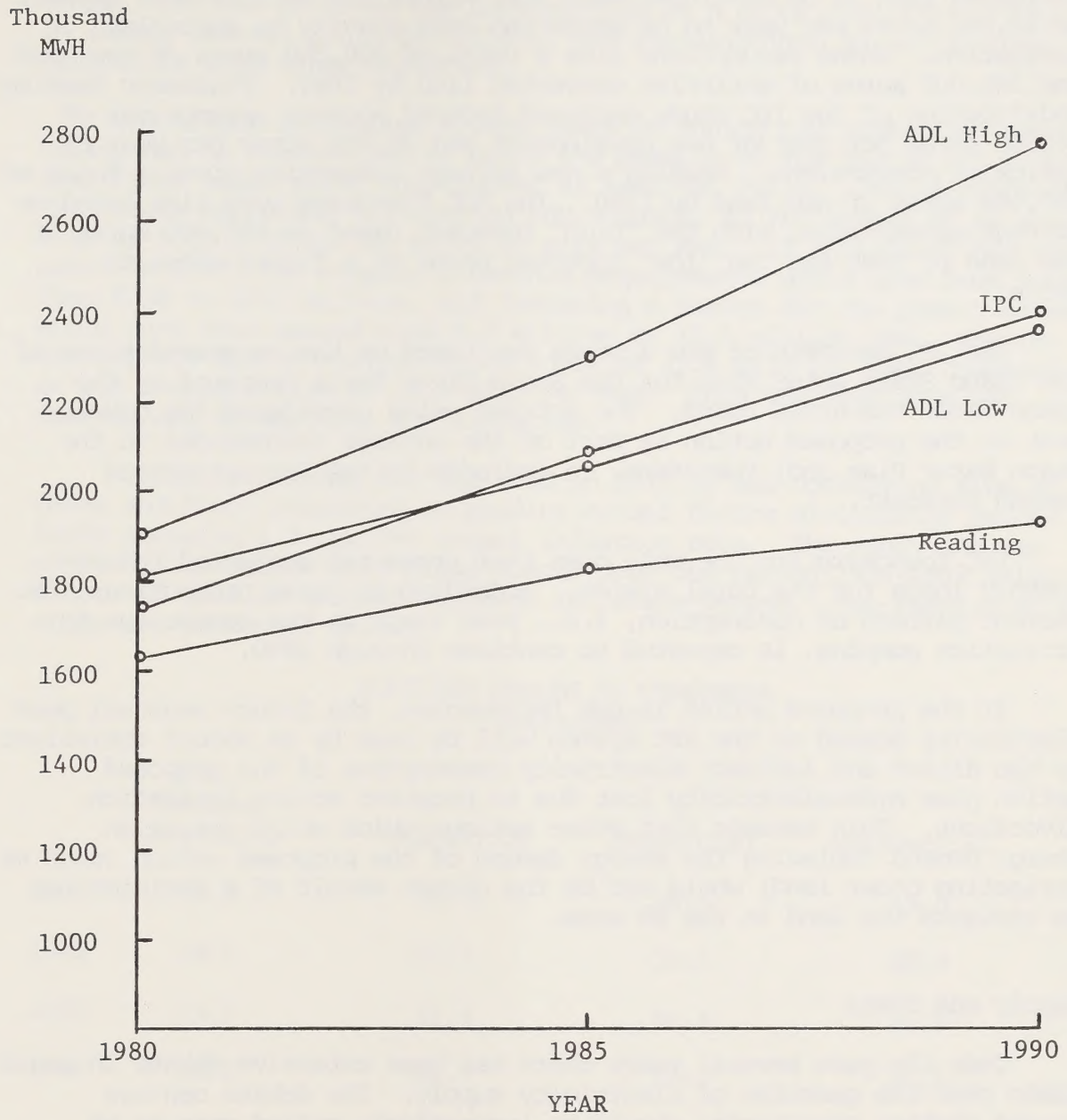


Figure 2-18

FORECASTS IPC IRRIGATION SALES
1980-1990

Sources: Same as Figure 2-17

irrigated land to be developed each year within the service area as well as 40,000 acres per year to be converted from gravity to sprinkler irrigation. These assumptions give a total of 300,000 acres of new land and 585,000 acres of sprinkler converted land by 1990. Professor Reading's modification of the IPC study employed reduced acreage assumptions of 10,000 acres per year of new development and 25,000 acres per year of sprinkler conversions. Reading's new acreage assumption gives a total of 150,000 acres of new land by 1990. The ADL forecasts were also based on acreage assumptions, with the "high" forecast based on 600,000 acres of new land by 1990 and the "low" forecast based on a figure close to IPC's.

The IPC estimate of new acreage was based on the recommendations of the Idaho State Water Plan for the Snake River Basin prepared by the Idaho Water Resources Board. The acreage being considered for development in the proposed action is part of the acreage recommended in the State Water Plan and; therefore, is included in the IPC irrigation demand forecast.

IPC forecasts are the only ones that presented projected future monthly loads for the total system. According to these projections, the current pattern of consumption, i.e., peak loads in the summer due to irrigation pumping, is expected to continue through 1990.

If the proposed action is not implemented, the future seasonal peak electricity demand on the IPC system will be less by an amount equivalent to the direct and indirect electricity consumption of the proposed action plus hydroelectricity lost due to proposed action irrigation diversions. This assumes that other actions which would create an energy demand replacing the energy demand of the proposed action (such as irrigating other land) would not be the direct result of a decision not to irrigate the land in the ES area.

Supply and Costs

Over the past several years there has been extensive debate in south Idaho over the question of electricity supply. The debate centers around whether electricity should be increasingly relied upon as an energy delivery form, and, if so, how it should be generated. The future cost of electricity will depend on the answer to these questions and on the actual future levels of demand.

Future electricity supplies and cost will be described for two policy scenarios that have been put forward and seriously discussed. For convenience, we will label these the "electricity self-sufficiency" and the "reliance on outside sources" scenarios.

Electricity Self-Sufficiency Scenario The Idaho State Water Plan states that, "to meet the state's objective of reducing reliance on imported electric power...considerable instate sources of power will be needed in the future." (Idaho Water Resources Board, "The State Water Plan--Part II", page 144, December 1976). IPC itself has in effect

proposed a policy of self-sufficiency for the company over the past few years. IPC has proposed the construction of a major coal-fired facility in Idaho, several hydro facilities, and participation in new thermal facilities with other utilities.

The effect on average system costs of adding new generating capability can be illustrated by using the example of the 500 MW IPC proposed coal-fired plant to be constructed at American Falls. The addition of this plant would add 3.3 million MWH annually to IPC supply at an annual cost of \$123 million, or about 37 mils per KWH. If this plant had been added in 1977, the company's revenue requirements would have been increased from \$150 to \$273 million, and (assuming a market for the power) sales would have been raised from 9.2 million to 12.5 million KWH. The resulting new system average price would be 21.8 mils per KWH, compared to an old average price of 16.3 mils per KWH. This analysis does not include any assumptions for inflation.

A study performed for the IPUC in 1977 by the consulting firm of Dames and Moore attempted to predict actual future electricity prices in Idaho assuming a 5 percent annual inflation rate. The study assumes construction of new coal-fired plants over the period 1976-1992 built at a rate to meet an assumed increase in future demand. The results of the study are presented below:

FORECAST PRICES TO CONSUMERS
(Mils/KWH)

	KWH Produced (Billions)	Industrial	Commercial	Residential
1976	14.8	10.1	18.5	19.0
1982	19.5	23.6	32.1	32.4
1987	23.2	38.4	46.4	46.9
1992	26.1	64.7	70.5	71.1

By 1992, the amount of KWHs produced has not quite doubled, but prices to consumers have nearly quadrupled for commercial and residential customers and increased sixfold for large industrial customers.

Reliance on Outside Sources Scenario: As an alternative to constructing facilities in Idaho sufficient to meet Idaho's demand, a policy of power trading and seasonal purchases has been discussed in Idaho electricity supply debates. South Idaho has a summer peak demand while the rest of the Pacific Northwest has excess power in the summer and a winter peak demand. Given certain legislative and policy decisions, this diversity could be taken advantage of in a purchase/trading scenario.

The least costly potential outside source of electricity is the Bonneville Power Administration. According to existing BPA law, public

customers such as municipal utilities have preference over industrial customers for BPA power. Currently, however, a large amount of BPA power is going to "direct service industrial customers", mostly aluminum plants. In 1978, legislation was proposed in the Idaho State Legislature to make the state of Idaho eligible to receive BPA power as a preferential customer. If this proposal were to go into effect immediately, this power, which would be distributed by IPC within its own service area, would actually lower the IPC system average price.

In the future, the price of BPA power, however, is almost certain to increase; in fact, BPA is currently (December 1978) considering a 90 percent rate increase. For purposes of a long-range future electricity cost estimate, it would be reasonable to assume a cost double the current rate, or 8 mils per KWH.

Another plausible source of power from outside Idaho is British Columbia (BC). During the 1977 drought, IPC made some purchases of electricity from a large thermal plant owned by BC Hydro at a rate of 25 mils per KWH. The Idaho Governor's Office has discussed the possibility of long-term purchases of power from BC Hydro. The potential supplies are large, especially in the summer, since BC Hydro is a winter peaking system.

At a current cost of 4 mils per KWH for BPA power and 25 mils per KWH for BC power, it seems certain that acquiring power from either of these two sources, through purchase or trade, would be less expensive than building new thermal facilities in Idaho. Current estimates of power costs from new plants, in 1977 dollars (without inflation), are in the range of 35-40 mils per KWH.

As stated before, the question of future supply and costs is intricately related with the question of future demand. Although definitive predictions of either future electricity demand or cost levels without the proposed action cannot be made, it can be said that if the proposed action is not implemented the future seasonal peak electricity consumption would be less by that amount of electricity the proposed action would have used. As a result, future electricity supply requirements and costs would be less.

Chemical Energy Environment

Figure 2-19 shows several different demand forecasts for petroleum consumption in Idaho. These were prepared by the Northwest Energy Policy Project and by the consulting firm of Bonner and Moore. The graph shows the wide range of possible consumption levels in the future, with the (NEPP) "high" and "low" ranging from 295 to 119 trillion British Thermal Units (BTUs) per year by the year 2000. All forecasts predict increasing petroleum use in Idaho. As in electricity predictions, the differences between the forecasts reflect different assumptions.

According to the Idaho State Tax Commission, in fiscal year 1977-78, a total of 521 million gallons of gasoline were consumed in Idaho. Of that, about 23 million gallons, or about 4 percent, were used for agricultural purposes. Data on diesel consumption put Idaho use at 316

Federal Energy Administration, Washington, D.C., 1977). Though this data is from different sources and years, it does suggest that agricultural petroleum use is, and in the future would remain, relatively small portion of total Idaho petroleum consumption.

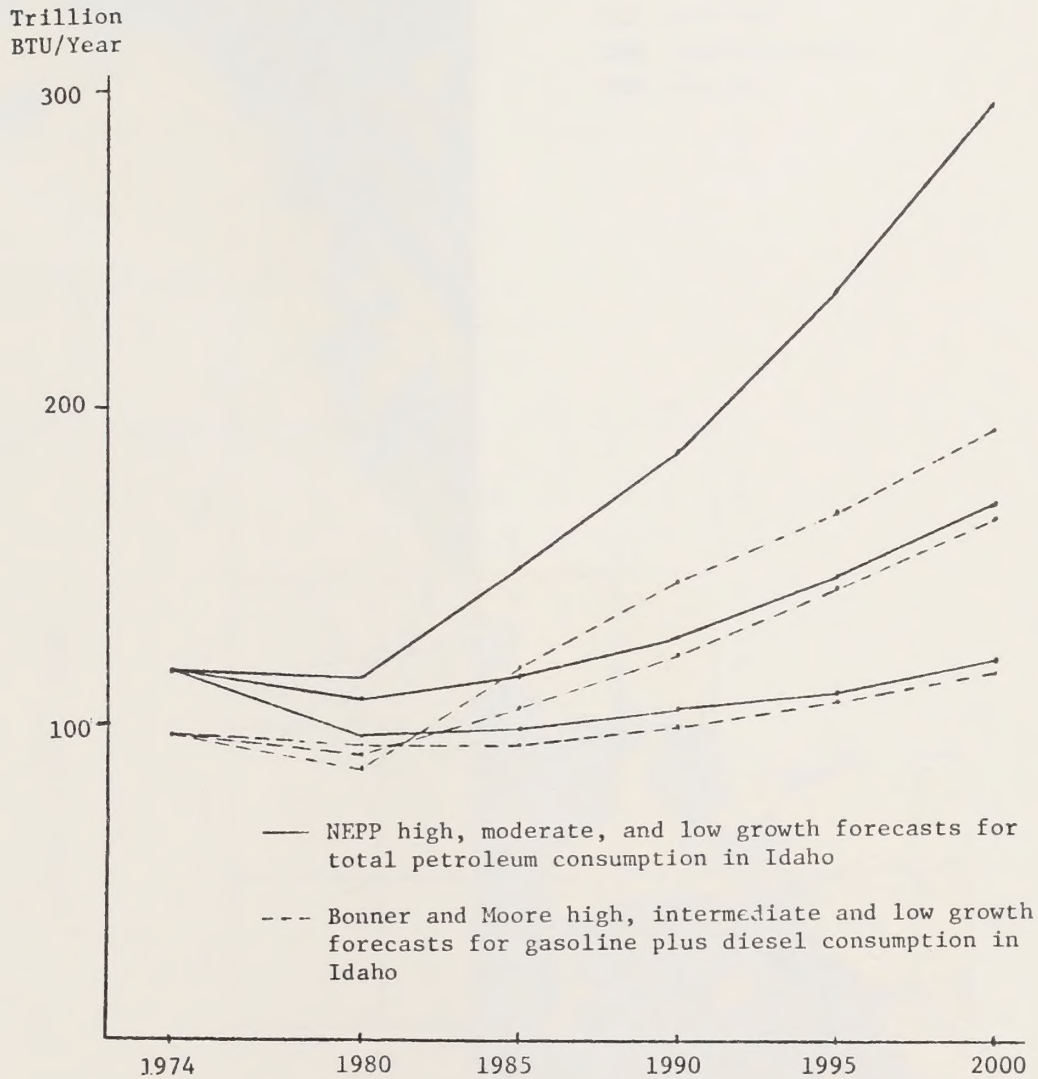


Figure 2-19

DEMAND FORECASTS FOR PETROLEUM
CONSUMPTION IN IDAHO

Sources: "Northwest Energy Policy Project, Energy Demand Modeling and Forecasting, Final Report," 1977, and "Energy Demand Forecasts for the Northern Tier and Inland States, Vol. I," prepared by Bonner and Moore Assoc., Inc. for the D.O.E., 18 August 1978.

million gallons in 1975 (Bonner and Moore) and agricultural diesel use at 41 million gallons in 1974 ("Energy in Agriculture, 1974 Data Base," Federal Energy Administration, Washington, D.C., 1977). Though this data is from different sources and years, it does suggest that agricultural petroleum use is, and in the future would remain, relatively small portion of total Idaho petroleum consumption.

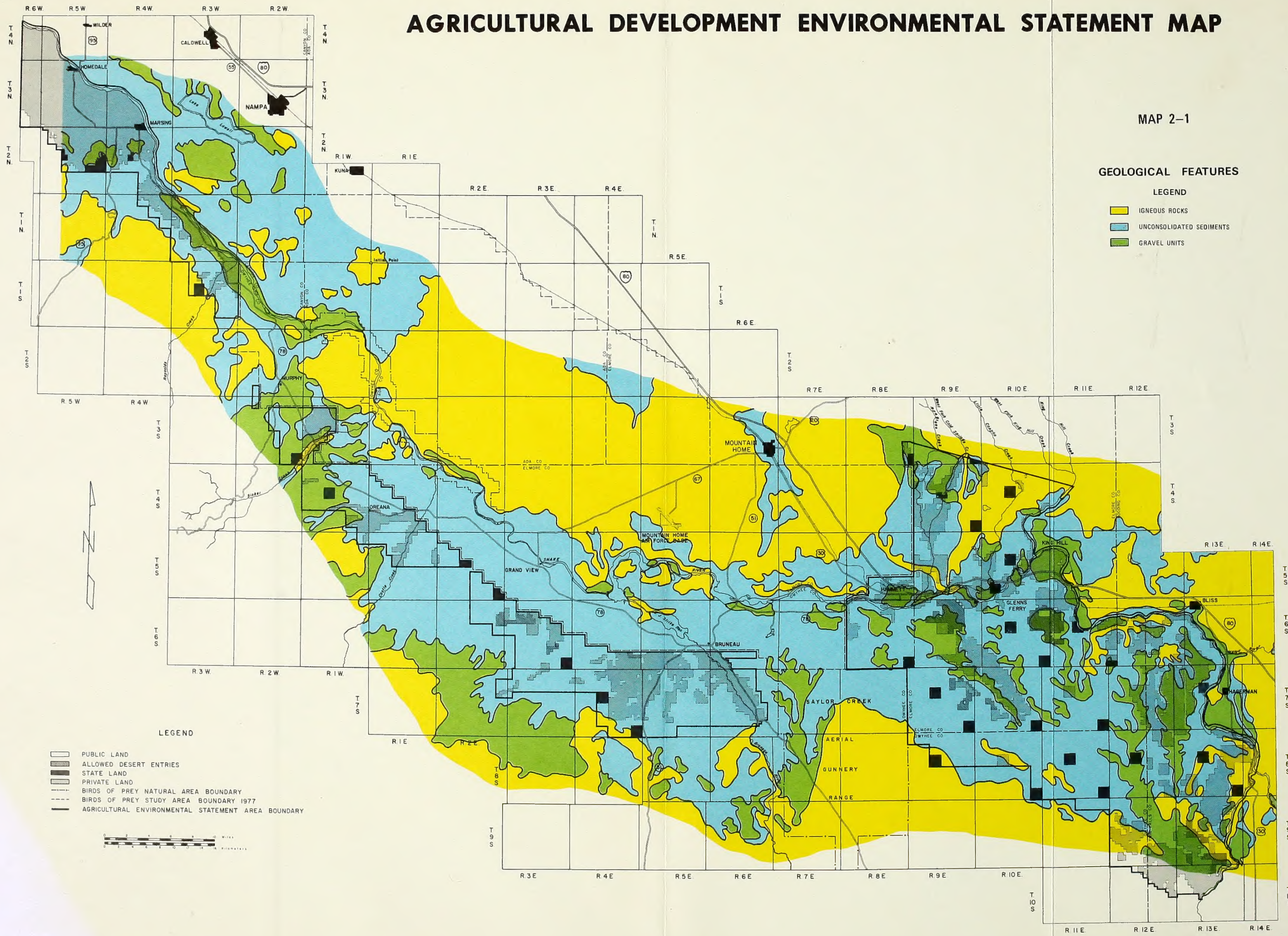
AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-1

GEOLOGICAL FEATURES

LEGEND

- IGNEOUS ROCKS
- UNCONSOLIDATED SEDIMENTS
- GRAVEL UNITS



LEGEND

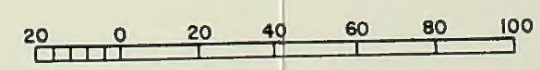
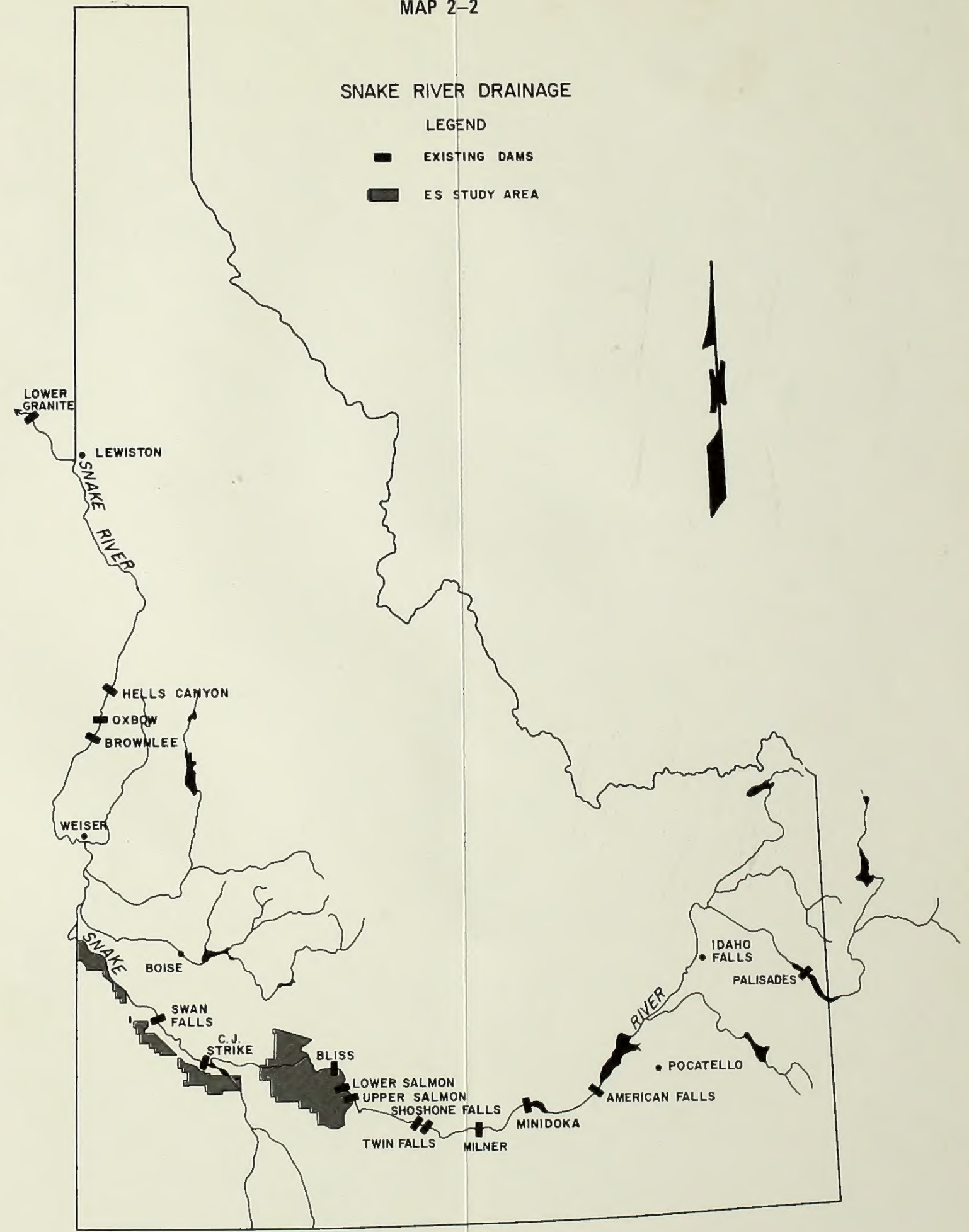
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- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



SNAKE RIVER DRAINAGE

LEGEND

- EXISTING DAMS
- ES STUDY AREA



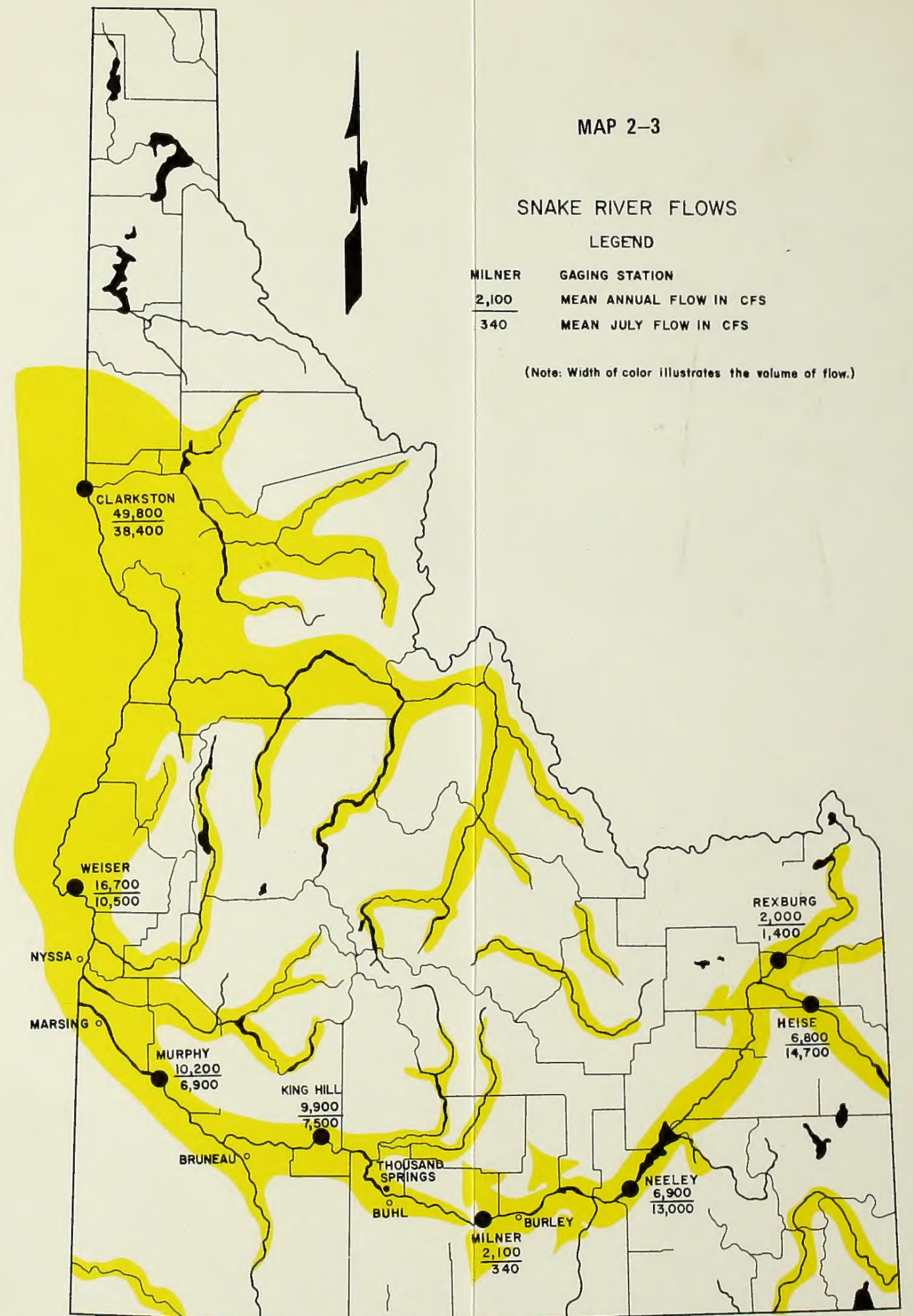
MAP 2-3

SNAKE RIVER FLOWS

LEGEND

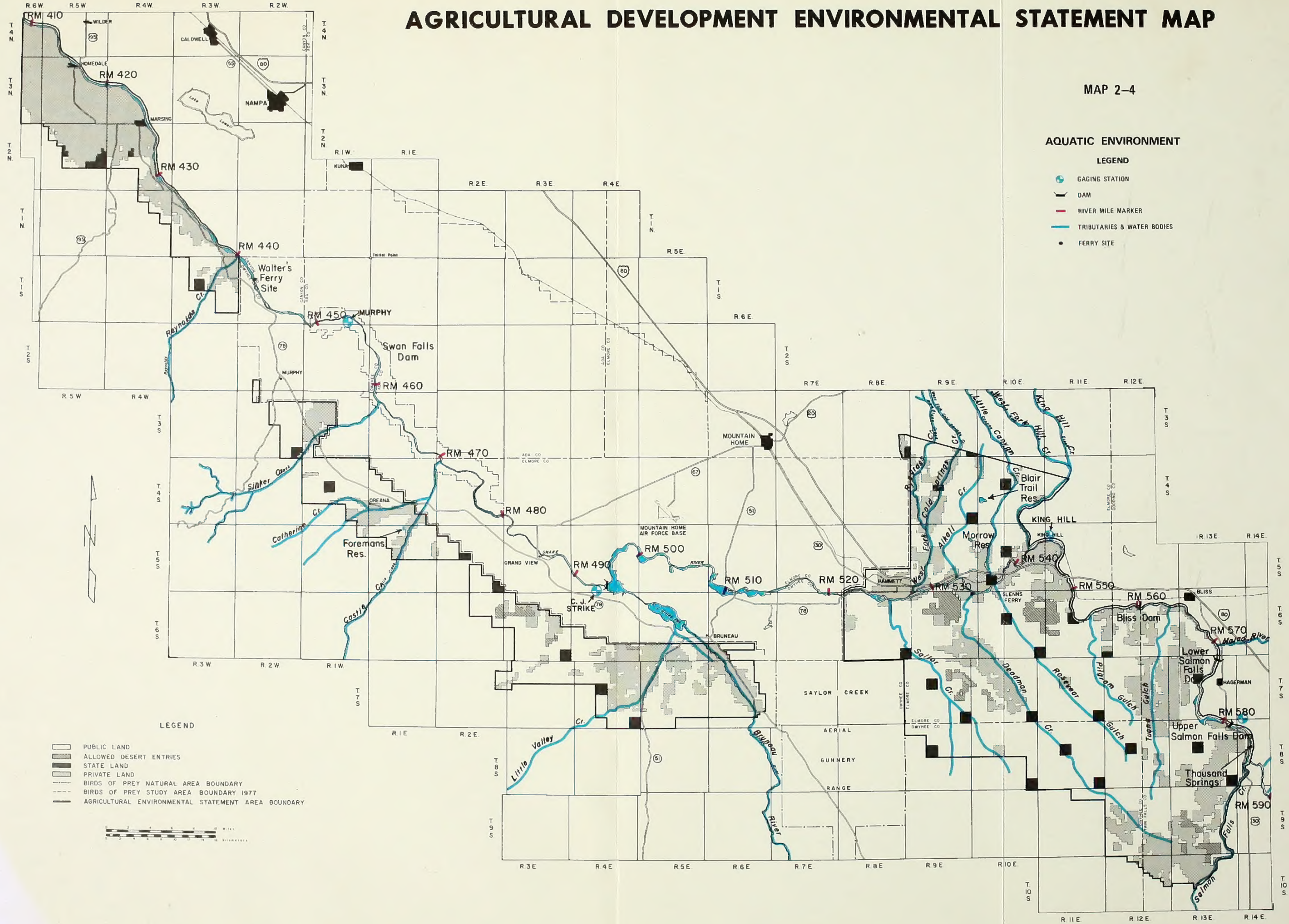
MILNER	GAGING STATION
2,100	MEAN ANNUAL FLOW IN CFS
340	MEAN JULY FLOW IN CFS

(Note: Width of color illustrates the volume of flow.)



AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-4



AQUATIC ENVIRONMENT

LEGEND

- GAGING STATION
- DAM
- RIVER MILE MARKER
- TRIBUTARIES & WATER BODIES
- FERRY SITE

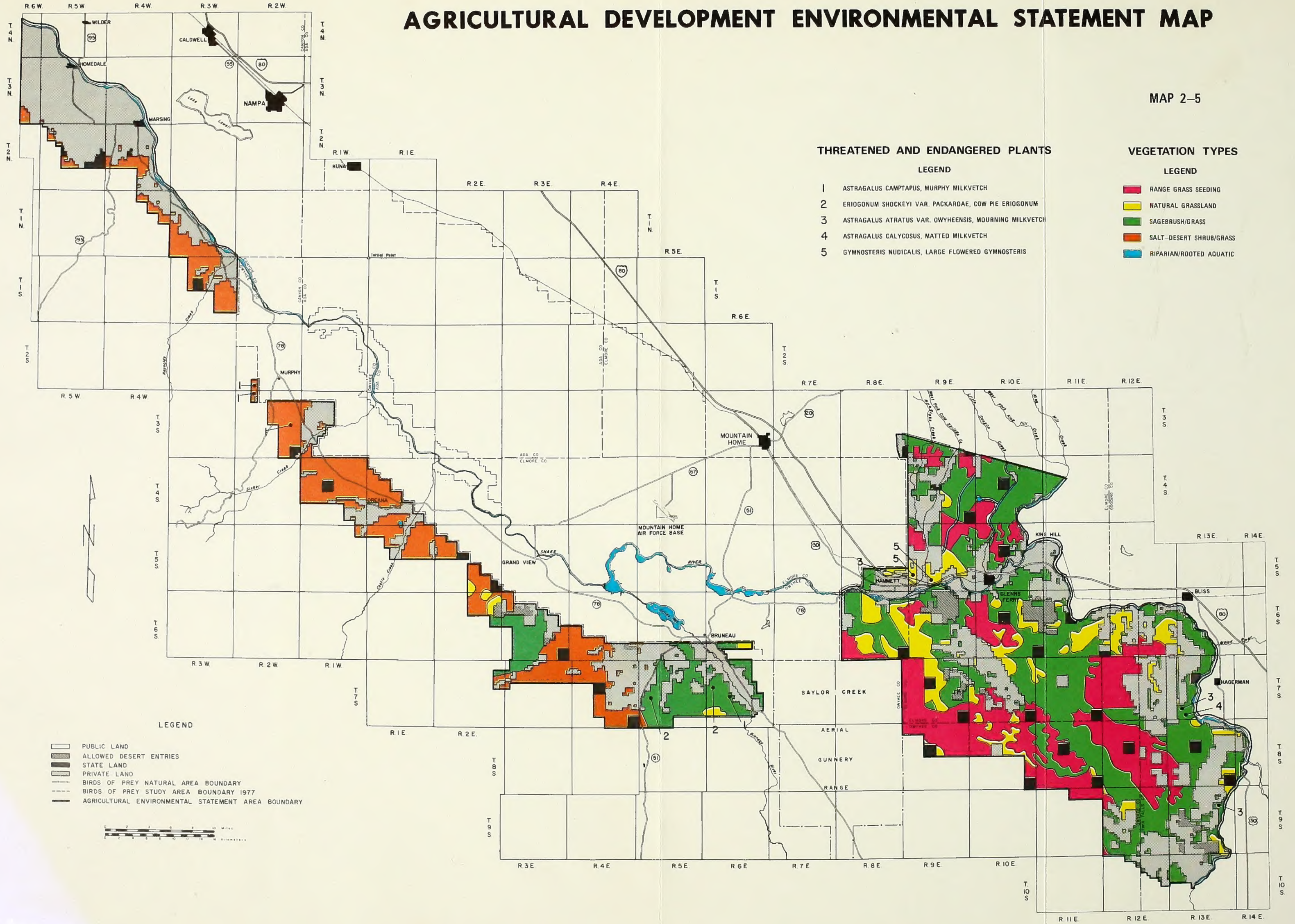
LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
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AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-5



THREATENED AND ENDANGERED PLANTS

LEGEND

- 1 ASTRAGALUS CAMPTAPUS, MURPHY MILKVETCH
- 2 ERIOGONUM SHOCKEYI VAR. PACKARDAE, COW PIE ERIOGONUM
- 3 ASTRAGALUS ATRATUS VAR. OWYHEENSIS, MOURNING MILKVETCH
- 4 ASTRAGALUS CALYCOSUS, MATTED MILKVETCH
- 5 GYMNOSTERIS NUDICALIS, LARGE FLOWERED GYMNOSTERIS

VEGETATION TYPES

LEGEND

- RANGE GRASS SEEDING
- NATURAL GRASSLAND
- SAGEBRUSH/GRASS
- SALT-DESERT SHRUB/GRASS
- RIPIARIAN/ROOTED AQUATIC

LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY

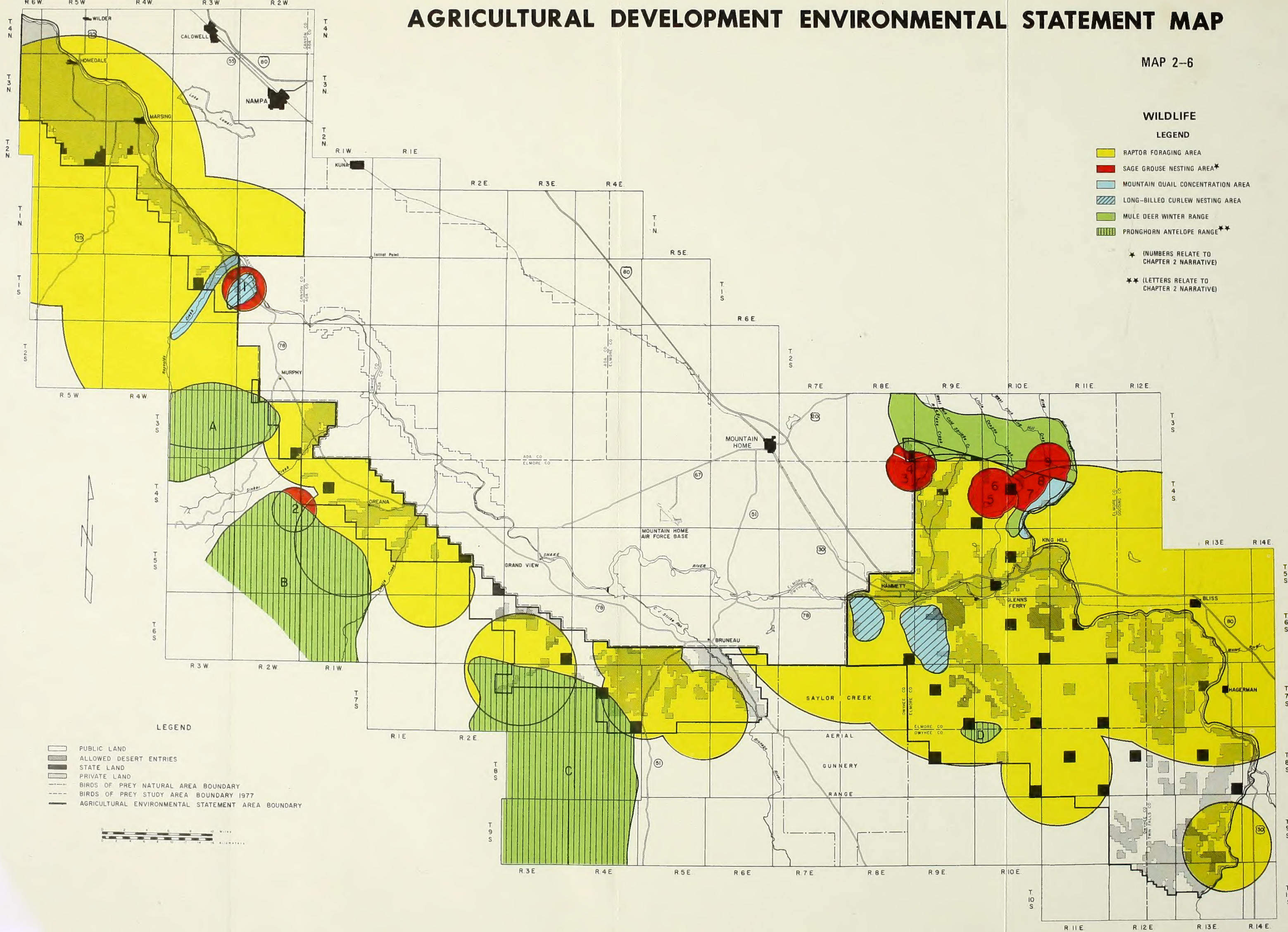


AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-6

WILDLIFE LEGEND

- RAPTOR FORAGING AREA
 - SAGE GROUSE NESTING AREA*
 - MOUNTAIN QUAIL CONCENTRATION AREA
 - LONG-BILLED CURLEW NESTING AREA
 - MULE DEER WINTER RANGE
 - PRONGHORN ANTELOPE RANGE**
- * (NUMBERS RELATE TO CHAPTER 2 NARRATIVE)
- ** (LETTERS RELATE TO CHAPTER 2 NARRATIVE)



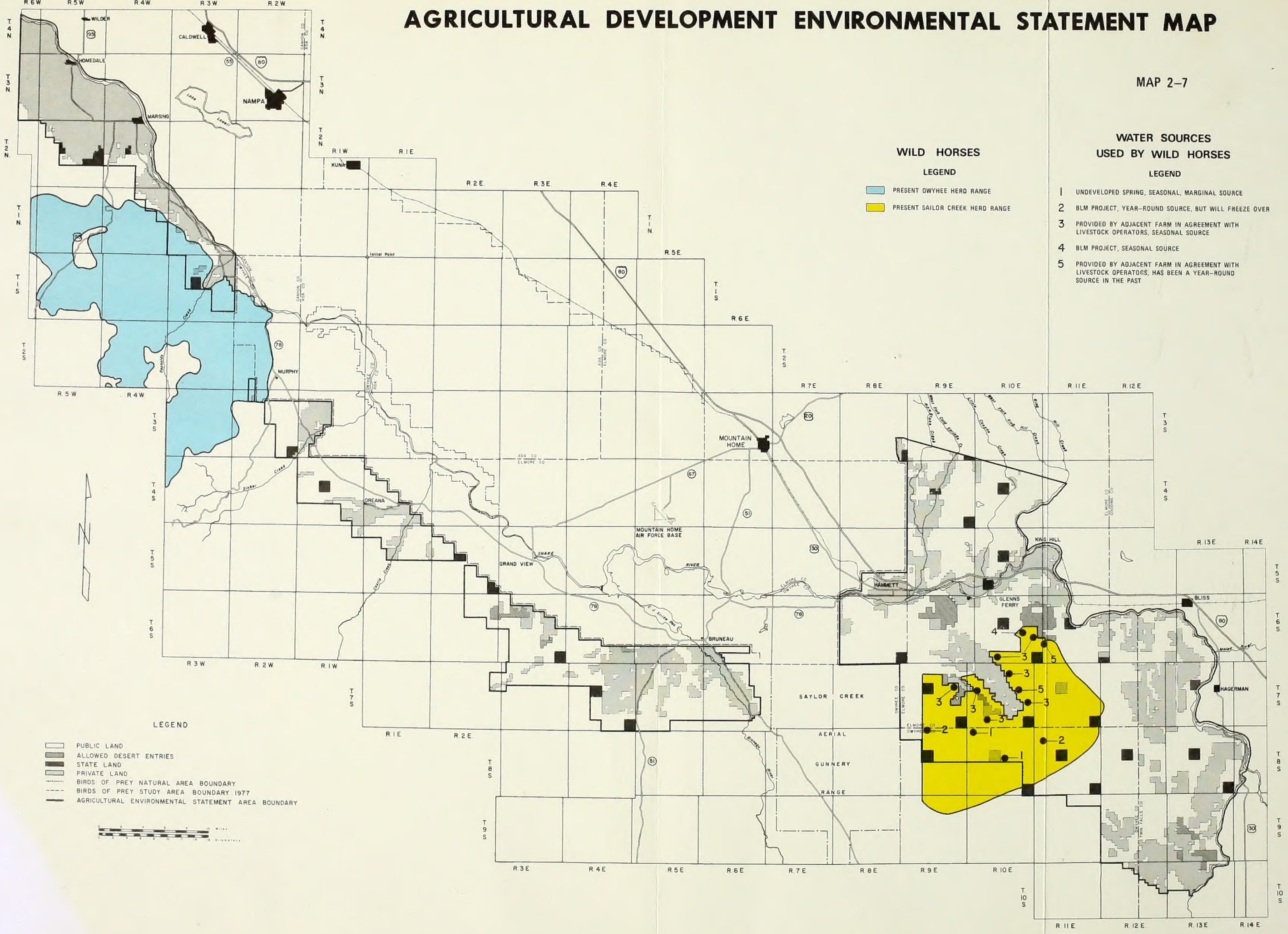
LEGEND

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- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
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- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-7



WILD HORSES

LEGEND

- PRESENT OWYHEE HERD RANGE
- PRESENT SAILOR CREEK HERD RANGE

WATER SOURCES USED BY WILD HORSES

LEGEND

- 1 UNDEVELOPED SPRING, SEASONAL, MARGINAL SOURCE
- 2 BLM PROJECT, YEAR-ROUND SOURCE, BUT WILL FREEZE OVER
- 3 PROVIDED BY ADJACENT FARM IN AGREEMENT WITH LIVESTOCK OPERATORS, SEASONAL SOURCE
- 4 BLM PROJECT, SEASONAL SOURCE
- 5 PROVIDED BY ADJACENT FARM IN AGREEMENT WITH LIVESTOCK OPERATORS, HAS BEEN A YEAR-ROUND SOURCE IN THE PAST

LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

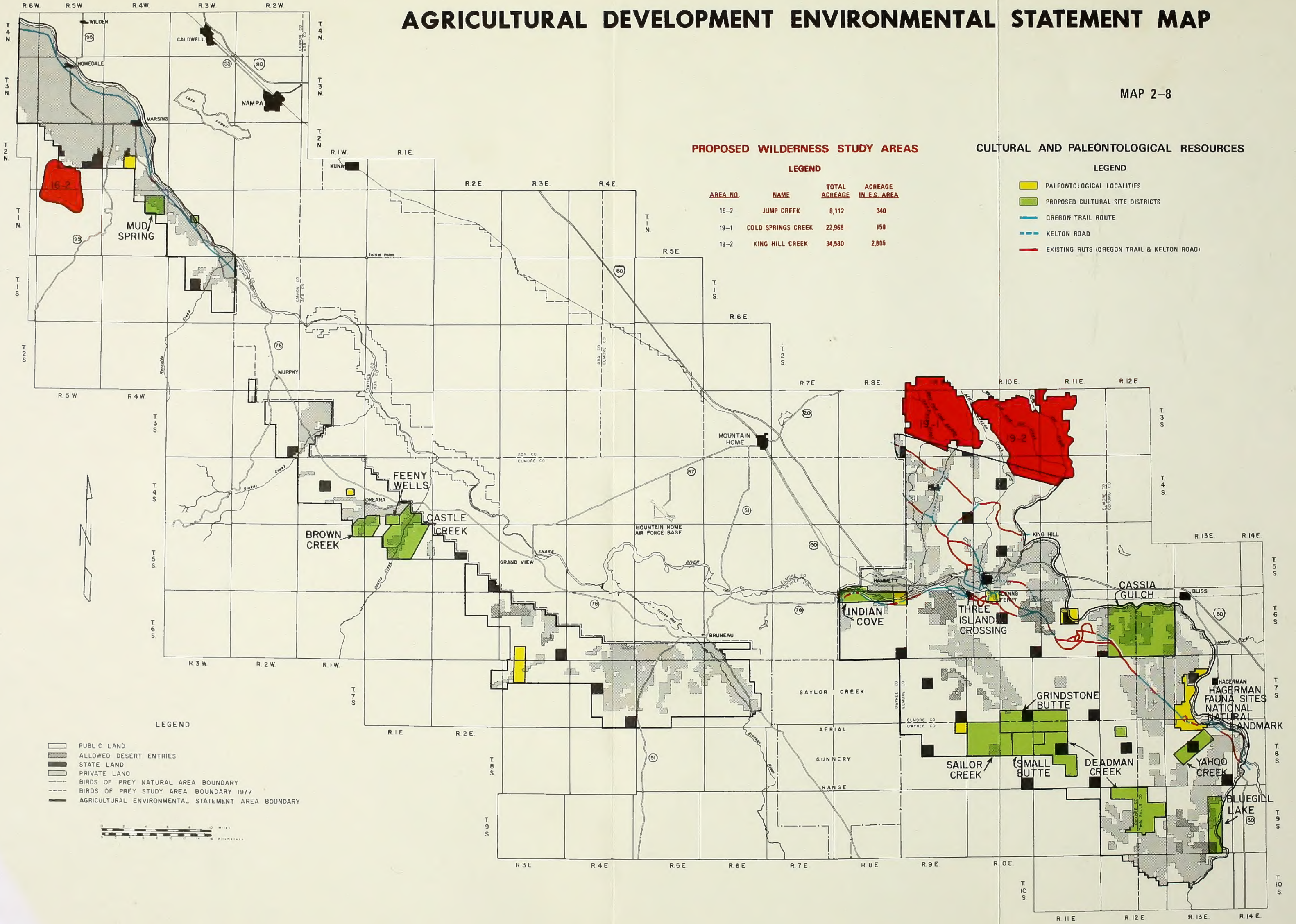
MAP 2-8

PROPOSED WILDERNESS STUDY AREAS

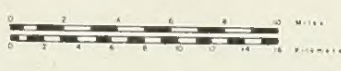
LEGEND			
AREA NO.	NAME	TOTAL ACREAGE	ACREAGE IN E.S. AREA
16-2	JUMP CREEK	8,112	340
19-1	COLD SPRINGS CREEK	22,966	150
19-2	KING HILL CREEK	34,580	2,805

CULTURAL AND PALEONTOLOGICAL RESOURCES

LEGEND	
	PALEONTOLOGICAL LOCALITIES
	PROPOSED CULTURAL SITE DISTRICTS
	OREGON TRAIL ROUTE
	KELTON ROAD
	EXISTING RUTS (OREGON TRAIL & KELTON ROAD)



LEGEND	
	PUBLIC LAND
	ALLOWED DESERT ENTRIES
	STATE LAND
	PRIVATE LAND
	BIRDS OF PREY NATURAL AREA BOUNDARY
	BIRDS OF PREY STUDY AREA BOUNDARY 1977
	AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



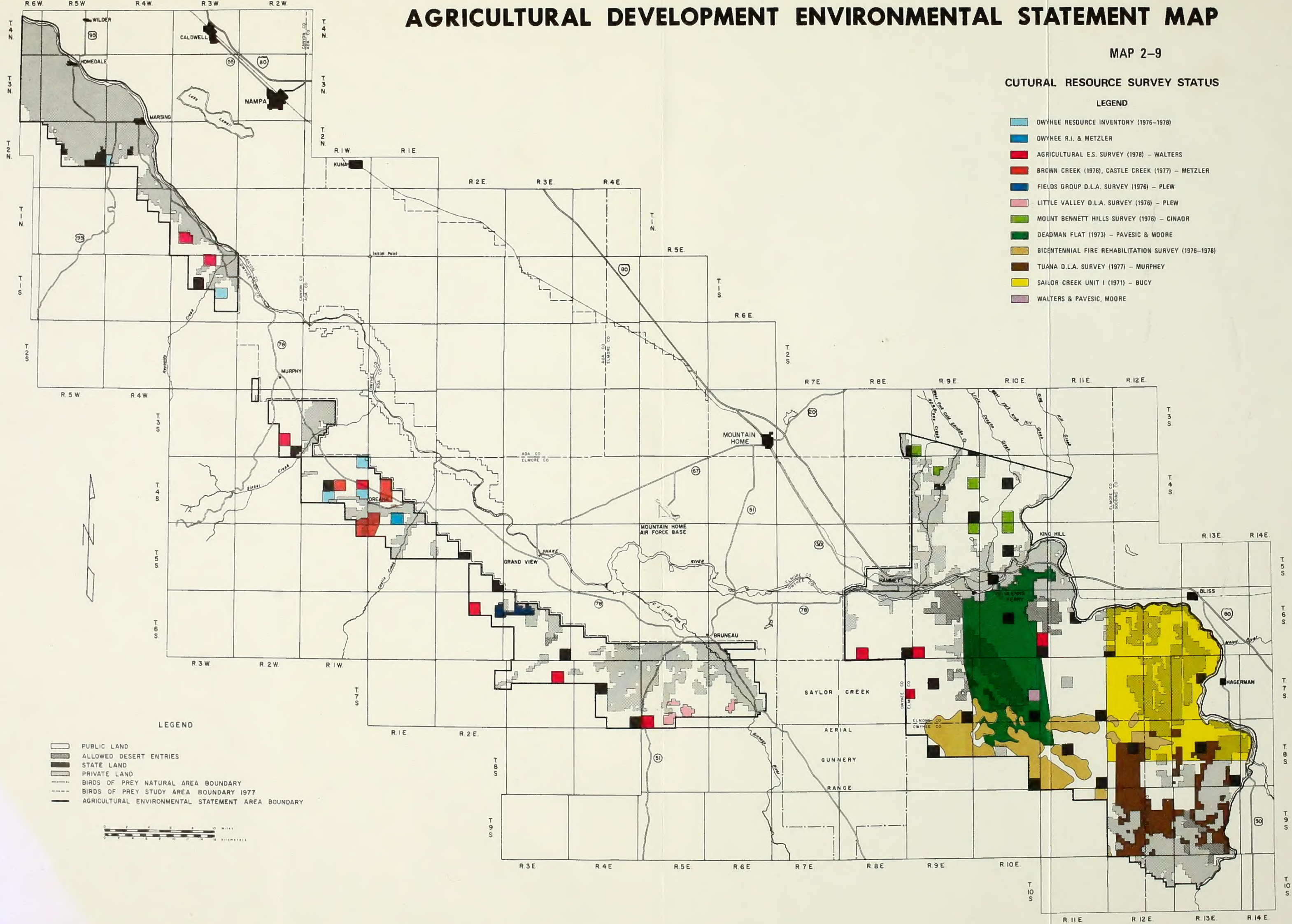
AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-9

CULTURAL RESOURCE SURVEY STATUS

LEGEND

- OWYHEE RESOURCE INVENTORY (1976-1978)
- OWYHEE R.I. & METZLER
- AGRICULTURAL E.S. SURVEY (1978) - WALTERS
- BROWN CREEK (1976), CASTLE CREEK (1977) - METZLER
- FIELDS GROUP D.L.A. SURVEY (1976) - PLEW
- LITTLE VALLEY D.L.A. SURVEY (1976) - PLEW
- MOUNT BENNETT HILLS SURVEY (1976) - CINADR
- DEADMAN FLAT (1973) - PAVESIC & MOORE
- BICENTENNIAL FIRE REHABILITATION SURVEY (1976-1978)
- TUANA D.L.A. SURVEY (1977) - MURPHEY
- SAILOR CREEK UNIT I (1971) - BUCY
- WALTERS & PAVESIC, MOORE



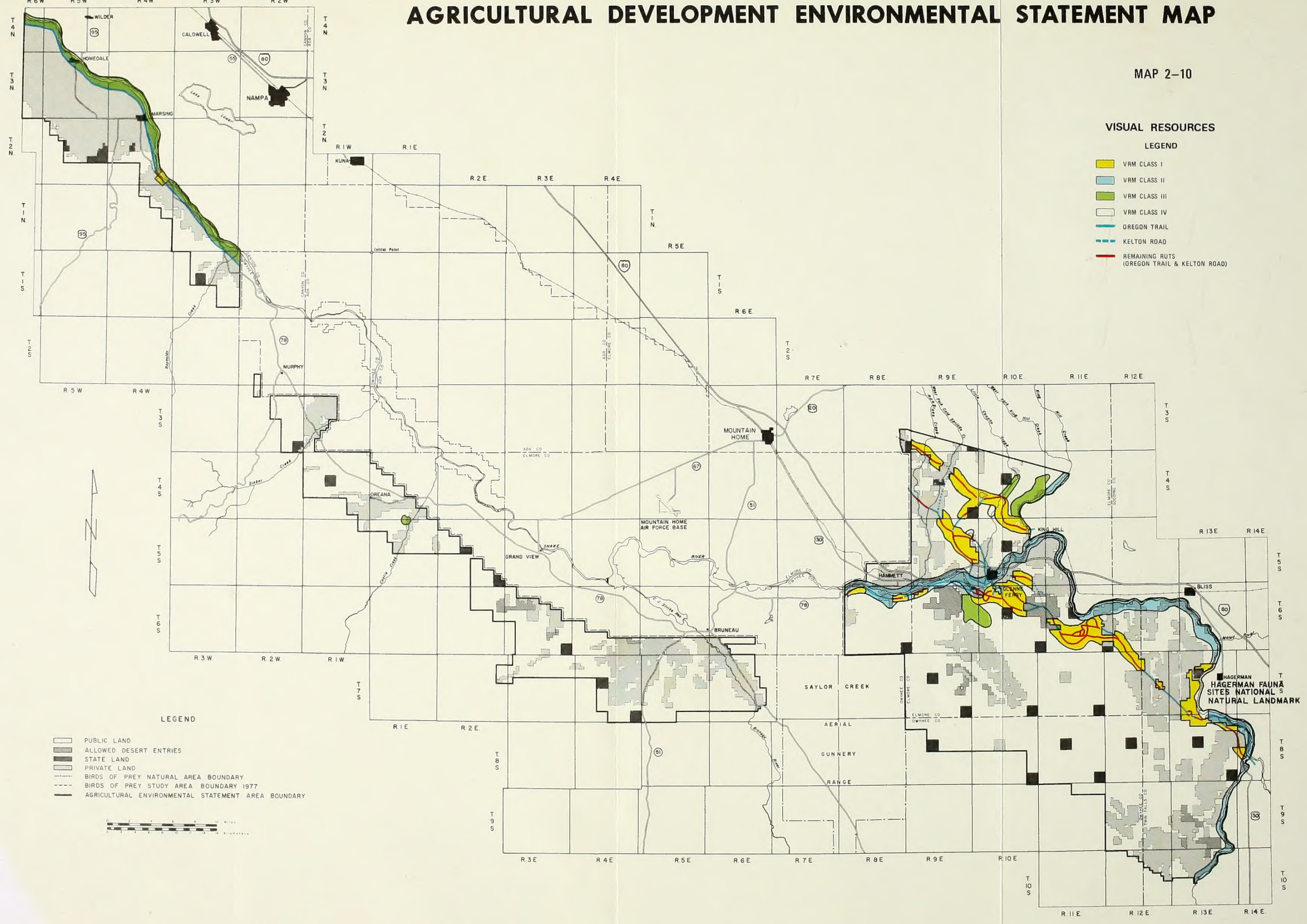
LEGEND

- PUBLIC LAND
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- PRIVATE LAND
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AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-10



VISUAL RESOURCES

LEGEND

- VRM CLASS I
- VRM CLASS II
- VRM CLASS III
- VRM CLASS IV
- OREGON TRAIL
- KELTON ROAD
- REMAINING RUTS (OREGON TRAIL & KELTON ROAD)

LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY






AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP








MAP 2-11

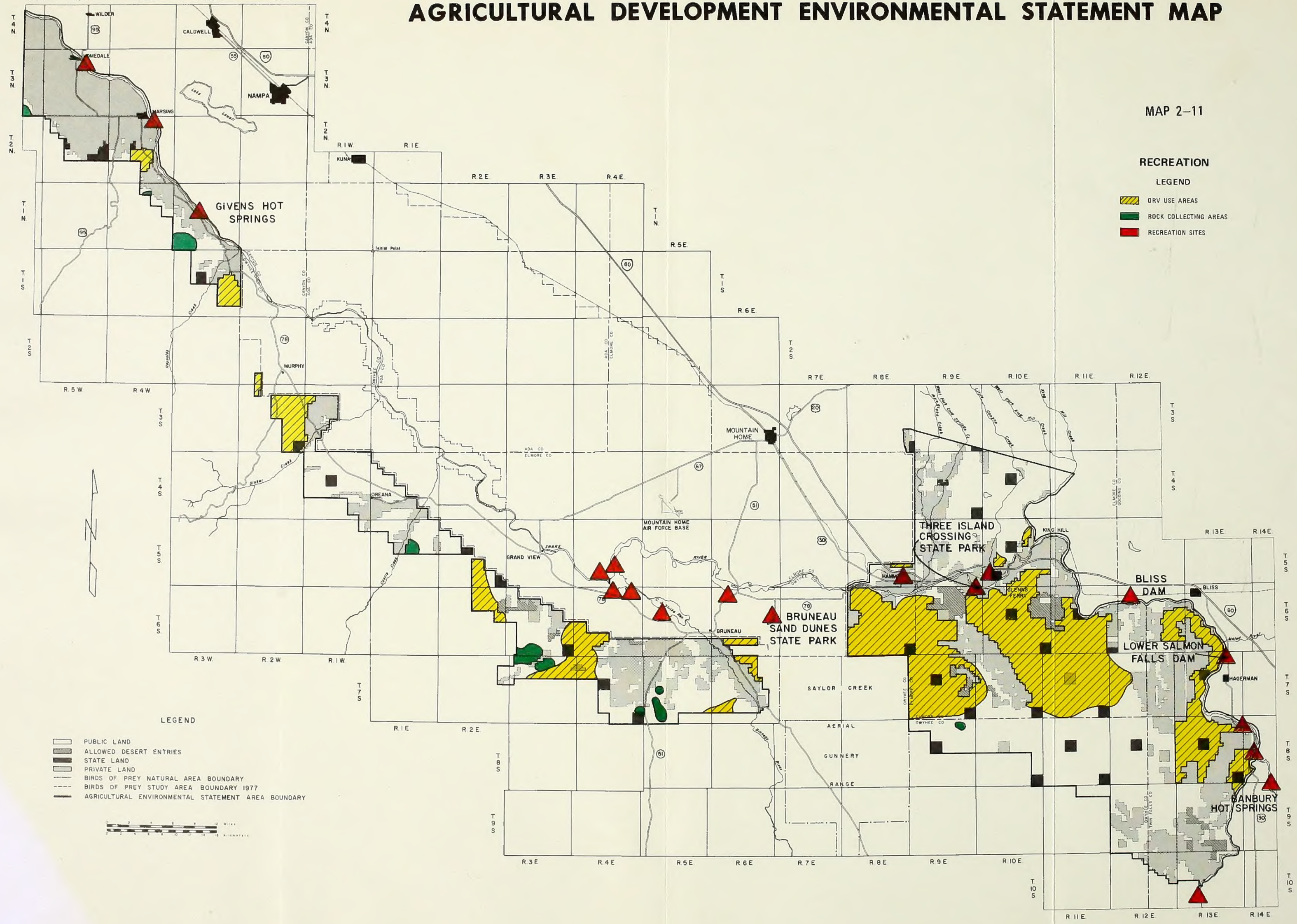
RECREATION

LEGEND

-  ORV USE AREAS
-  ROCK COLLECTING AREAS
-  RECREATION SITES

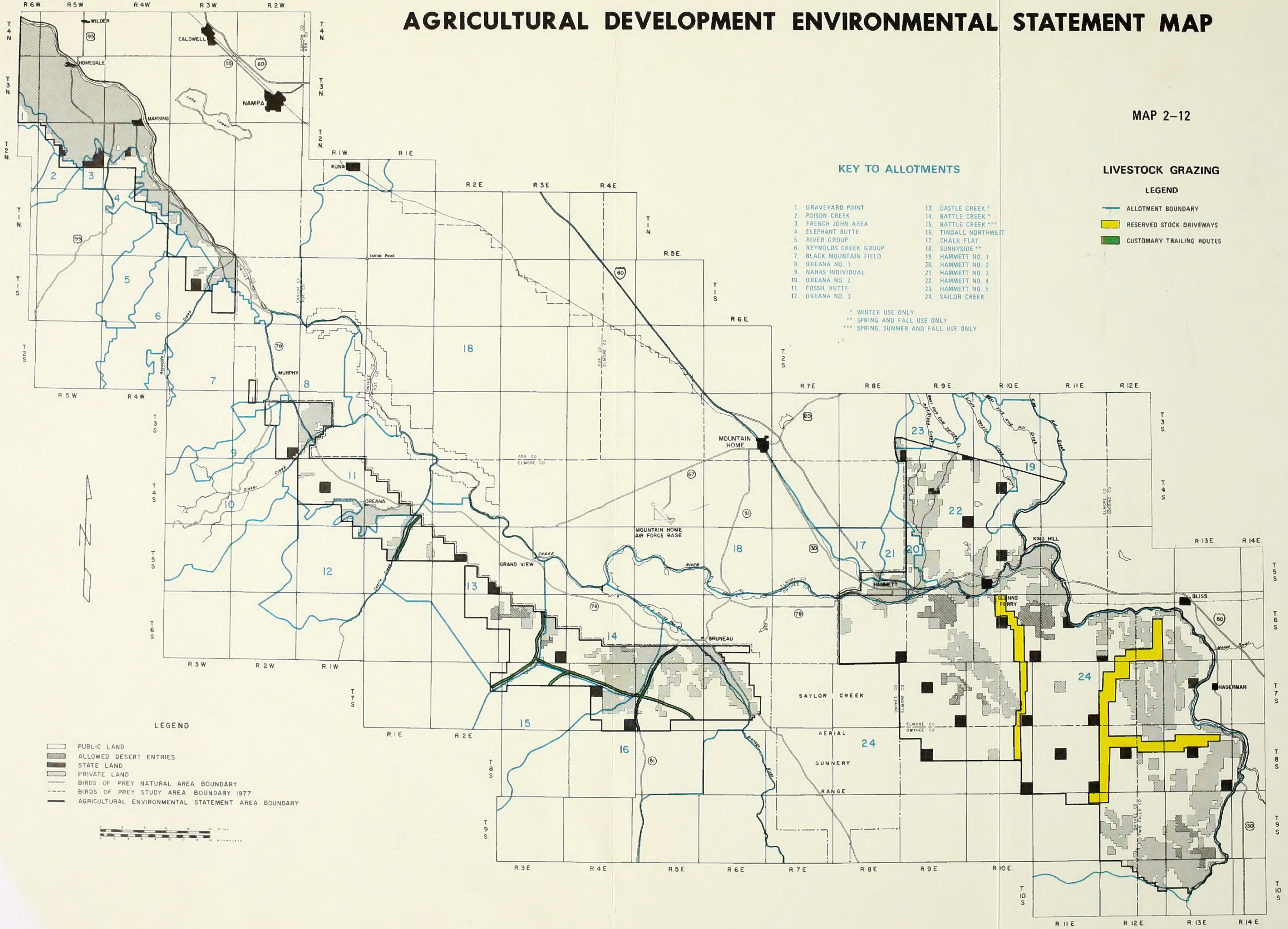
LEGEND

-  PUBLIC LAND
-  ALLOWED DESERT ENTRIES
-  STATE LAND
-  PRIVATE LAND
-  BIRDS OF PREY NATURAL AREA BOUNDARY
-  BIRDS OF PREY STUDY AREA BOUNDARY 1977
-  AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-12



KEY TO ALLOTMENTS

- | | |
|-------------------------|-----------------------|
| 1. GRAVEYARD POINT | 13. CASTLE CREEK * |
| 2. POISON CREEK | 14. BATTLE CREEK * |
| 3. FRENCH JOHN AREA | 15. BATTLE CREEK *** |
| 4. ELEPHANT BUTTE | 16. TINDALL NORTHWEST |
| 5. RIVER GROUP | 17. CHALK FLAT |
| 6. REYNOLDS CREEK GROUP | 18. SUNNYSIDE ** |
| 7. BLACK MOUNTAIN FIELD | 19. HAMMETT NO. 1 |
| 8. OREANA NO. 1 | 20. HAMMETT NO. 2 |
| 9. NAHAS INDIVIDUAL | 21. HAMMETT NO. 3 |
| 10. OREANA NO. 2 | 22. HAMMETT NO. 4 |
| 11. FOSSIL BUTTE | 23. HAMMETT NO. 5 |
| 12. OREANA NO. 3 | 24. SAILOR CREEK |

* WINTER USE ONLY
 ** SPRING AND FALL USE ONLY
 *** SPRING, SUMMER AND FALL USE ONLY

LIVESTOCK GRAZING LEGEND

- ALLOTMENT BOUNDARY
- RESERVED STOCK DRIVeways
- CUSTOMARY TRAILING ROUTES

LEGEND

- PUBLIC LAND
- ▨ ALLOWED DESERT ENTRIES
- STATE LAND
- ▩ PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY



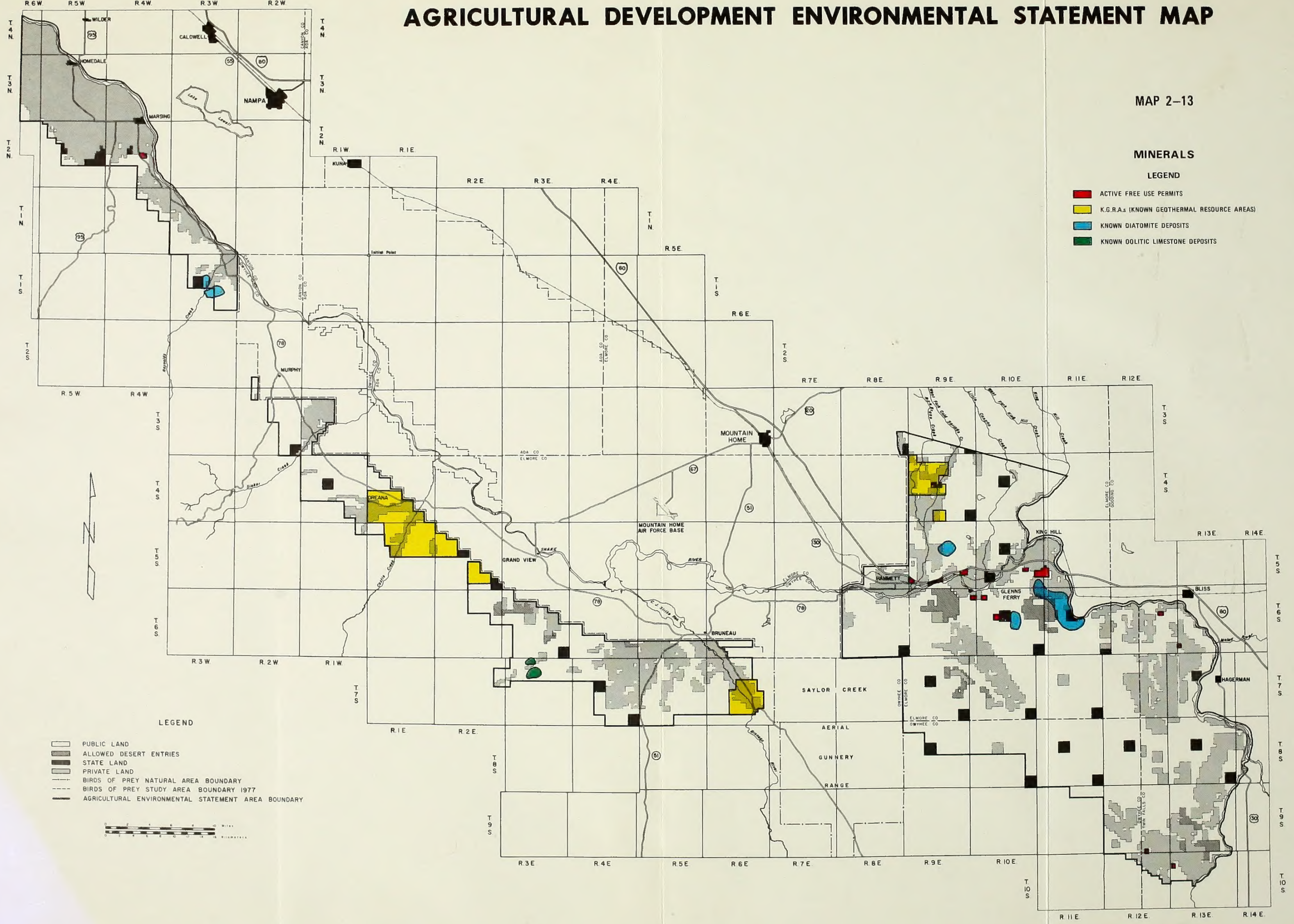
AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-13

MINERALS

LEGEND

- ACTIVE FREE USE PERMITS
- K.G.R.A.s (KNOWN GEOTHERMAL RESOURCE AREAS)
- KNOWN DIATOMITE DEPOSITS
- KNOWN OOLITIC LIMESTONE DEPOSITS



LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY





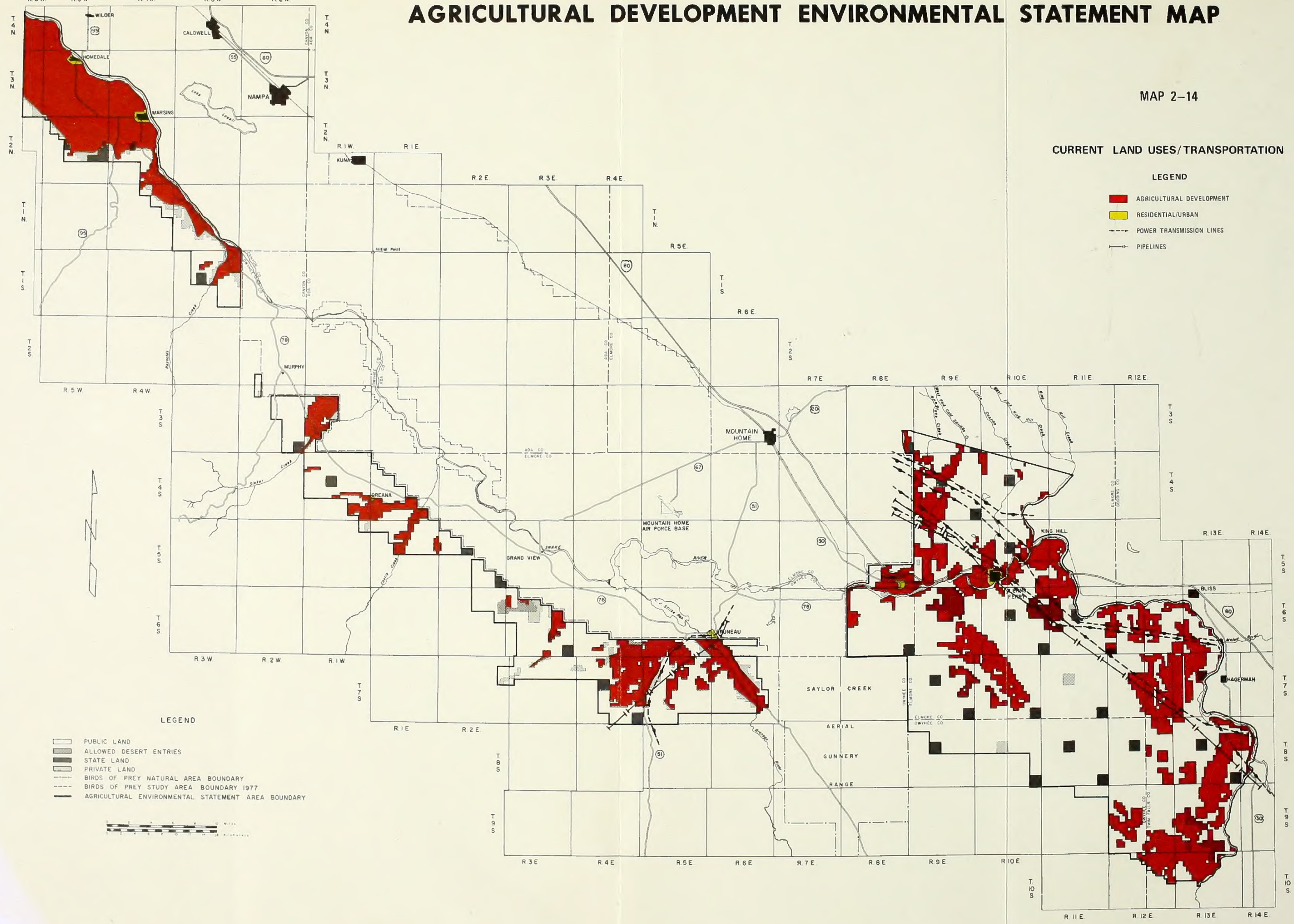
AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT MAP

MAP 2-14

CURRENT LAND USES/TRANSPORTATION

LEGEND

- AGRICULTURAL DEVELOPMENT
- RESIDENTIAL/URBAN
- POWER TRANSMISSION LINES
- PIPELINES

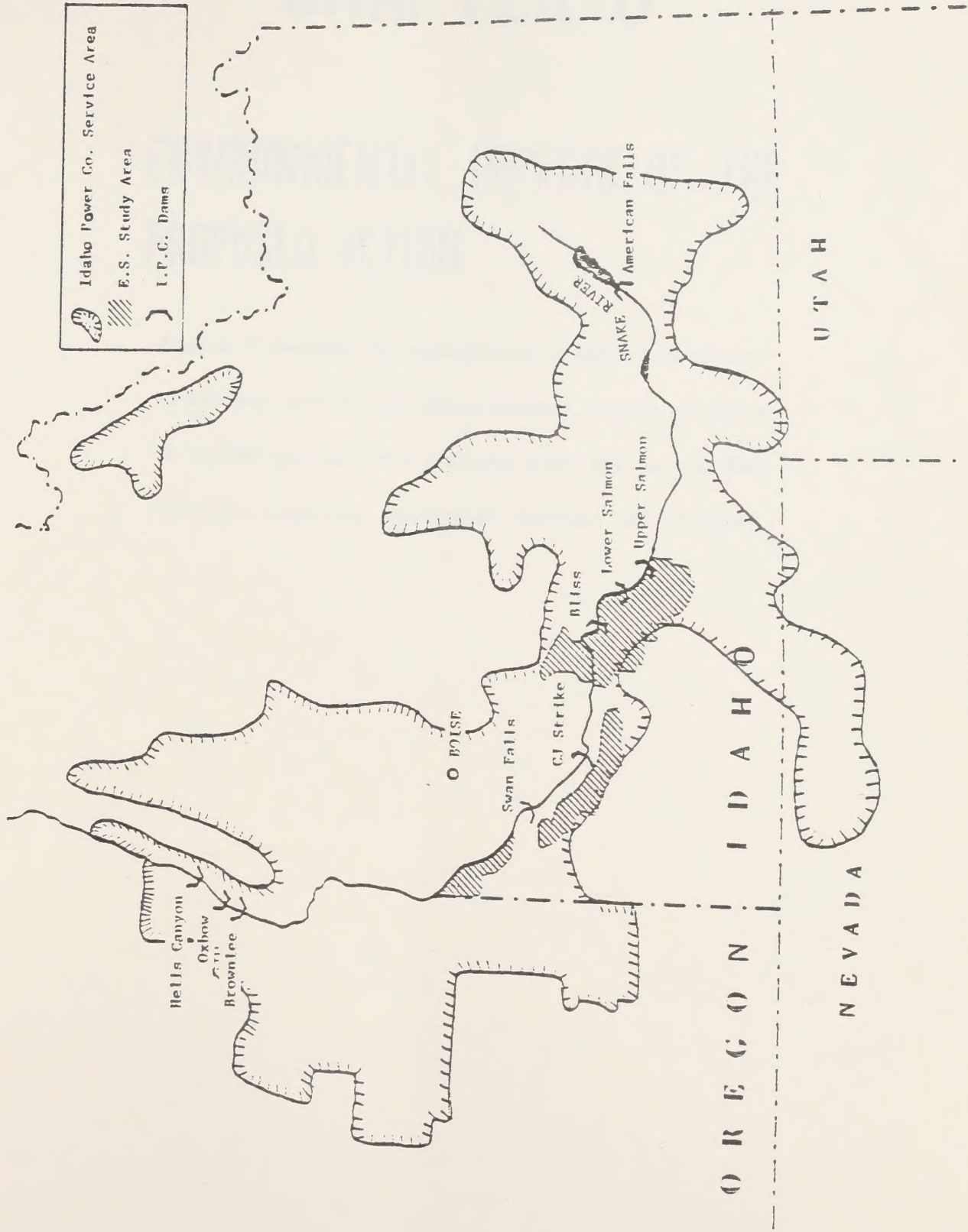


LEGEND

- PUBLIC LAND
- ALLOWED DESERT ENTRIES
- STATE LAND
- PRIVATE LAND
- BIRDS OF PREY NATURAL AREA BOUNDARY
- BIRDS OF PREY STUDY AREA BOUNDARY 1977
- AGRICULTURAL ENVIRONMENTAL STATEMENT AREA BOUNDARY







MAP 2-15

IDAHO POWER COMPANY SERVICE AREA



CHAPTER 3

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Chapter 3 describes the impacts likely to result from the proposed farm development. Where possible, impacts are linked to specific aspects of the proposed action and are described by their magnitude, importance, duration and incidence.

CHAPTER 3 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

INTRODUCTION

The majority of environmental impacts discussed in this chapter are common to the Desert Land Act (DLA) and Carey Act (CA) methods of land disposal. The reader should assume that the impacts described in this section apply to both disposal methods, except where the text specifically identifies impacts unique to either disposal method.

ASSUMPTIONS AND ANALYSIS GUIDELINES

The following assumptions were used to assess impacts depicted in this chapter. Some of these assumptions apply to more than one environmental category.

1. 2.58 acre feet of water per acre per year will be required to irrigate the expected crop rotation of 22% potatoes, 21% dry beans, 17% winter wheat, 17% barley, 17% sugar beets and 6% alfalfa in the ES area (Idaho Department of Water Resources).
2. There would be a 15 percent return flow of applied irrigation water to the Snake River via underground infiltration with some return emerging as surface flows in tributaries of the Snake. This water would return over a ten month period, amounting to about 70 CFS at the Murphy gage. (The 15 percent is the difference between amount diverted and consumption rate of crops under existing high-lift pumping. Timing of return is based on studies in upper Snake River and Boise Valley, IDWR.)
3. There will be no surface irrigation return flows leaving the fields as a result of normal efficient sprinkler irrigation operations and BLM requiring catchment ponds as part of DLA and CA project approval.
4. Infiltrated irrigation water that emerges as surface flows is the major source of increased salts and nutrients in the Snake River.
5. Of the 111,015 acres of farmland to be developed under the proposed action, 3 percent (3,330 acres) would be devoted to non-crop areas (roads, buildings, etc.).
6. Farm project perimeters will be fenced by farm developers to keep livestock using adjoining public land from trespassing on farm ground.
7. Livestock grazing reductions, in the amount equal to the AUMs eliminated on public lands from farm development, will be made by the BLM.

8. A Carey Act (CA) farm unit will be a joint husband and wife filing totaling 320 acres. A Desert Land Act (DLA) farm unit will be a joint husband and wife filing totaling 640 acres.

9. Irrigation will be done with closed pipe, rather than canals, all the way from the river to the point of delivery.

10. Friction losses in pumping the water through closed pipe were assumed to be 0.8 percent, which is equivalent to .008 feet of head per foot of pipe, or 42 feet of head per mile.

11. Each parcel of land will be irrigated as a part of a larger (6000 to 7000 acres) project, such as typically exists now in the ES area. This assumption determines the distance, 9080 feet, that the water must travel in closed pipe once it has reached the edge of the project.

12. Irrigation will be adjusted by sideroll sprinklers.

13. A value of 70 psi is assumed for calculating pressurization head. This represents the average pressure maintained at the intakes to sideroll sprinkler lines which would operate with a sprinkler head pressure of 50-60 psi.

14. Motors and pumps will operate at 90 percent efficiency, which yields an overall motor-pump efficiency of 80 percent. This assumption represents the upper limit of efficiency for irrigation pumps. If, in actual practice, pumps and motors are less efficient, then electricity consumption will be proportionally greater.

IMPACT ANALYSIS

CLIMATE

There would be no significant impacts on the existing climate from any of the transfer methods. Temperatures would be very slightly moderated and humidity would increase. It is doubtful either of these changes would be noticeable.

AIR QUALITY

Air quality conditions in the ES area are presently good. Based on limited data, it appears the only standard that is ever exceeded is particulates, and this standard is exceeded infrequently.

The proposed action would lower air quality by causing dust particulate concentrations to increase. Particulate increases would occur mostly during the spring months when wind velocities are highest and farm fields are disturbed. These increases would also be the result of more acres being bare of vegetative cover (lying fallow) during the

windy periods. It appears the annual secondary air quality standards would be exceeded during March, April, and May - the months of cultivation and planting. Based on observations in other existing agricultural areas, the primary and 24-hour standards would also be exceeded about one to three days per month during these same months.

According to Idaho Department of Health and Welfare findings, the average annual increase in particulate pollution due to new agricultural development in the ES area would not exceed more than 10 micrograms per cubic meter. (IDHW - 1977 State of Idaho Ambient Air Profile).

It has been reported and substantiated in the available data that dust storms of high intensity (to 2699 ug/m³ at Jerome) do occur occasionally when high winds and other appropriate climatic conditions exist. These situations cause heavy loading of the air with dust particulates over a short time span (2 to 3 hours). This results in soil drifts across roads in agricultural areas, reduced visibility to near zero, hazardous driving conditions, and deposits of soil in residential areas in the vicinity of the affected agricultural land. The communities most affected in or near the ES area would be Hammett, Hagerman, Bruneau, Buhl, Glens Ferry, and Twin Falls. It is expected that these conditions would exist and probably grow more serious in the ES area.

The projected concentrations of airborne particulates apparently will not cause any more human health problems than currently exist. People who have respiratory problems - such as bronchitis, emphysema, silicosis, or asthma - and are affected by current airborne-particulate levels will be no more seriously affected by future levels. People with allergic tendencies are and will be affected. People without allergic tendencies will not develop allergies even if particulate concentrations rise. This is the concensus of opinions of Idaho Dept. of Health and Welfare personnel, Dr. V. Anderson (Buhl) and Dr. Askins (Jerome). They feel that although additional farming activity may raise particulate levels there will not be an increase in respiratory disease cases. From personal observations they were not able to see any correlation between patient visits and particulate levels caused by farming activities.

It is recognized that monitoring and enforcement of particulate levels and air quality standards is minimal. Little is known about the relationship of farm-related particulates and human health. But again, based upon opinions of local physicians and other specialists, it does not seem likely that additional farm development will adversely affect human health.

Construction of a coal fired plant to provide electricity for the proposed action is possible. However, as explained under the Proposed Action section of Chapter I, because of the uncertainty of where or what kind of facility it could be, it is impossible to discuss specific environmental impacts associated with such a power plant. Air pollution

from a coal-fired power plant would pose the principal environmental impact although state and federal air quality standards would be met. Based on existing coal-fired plants, the gross amount of emissions produced from this plant would be approximately 188 tons/day of fly ash, 94 tons/day of sulfur dioxide (SO₂), and 84 tons/day of nitrogen dioxide (NO₂). By current technology, installation of electrostatic precipitators could remove up to 99.5 percent of fly ash emissions (smoke) and sulfur scrubber equipment could remove up to 90 percent of the SO₂ for a plant that was operating at full capacity. The extent of air pollution equipment installed would depend on standards set by the regulatory agencies at the time the power plant was constructed.

Ground and air application of pesticides and other chemicals would cause some local air quality deterioration. It is doubtful that concentrations would become high enough to affect human health, but there is likely to be localized problems such as herbicide drift onto adjoining fields.

In conclusion, it appears that air quality would be lowered if the proposed action occurs. Primarily, airborne particulates would increase in periods of farm activity. This would cause irritation and discomfort to people subject to respiratory problems. Airborne chemicals (pesticides and herbicides) would increase slightly.

GEOLOGY AND TOPOGRAPHY

There would be no impacts to geology and topography.

SOILS

Implementation of the proposed action would influence soils and their potential productivity. The most significant change that would occur is the increase in vegetative productivity. Presently, the area is producing about 160 lbs. of useable native livestock forage per acre. Forage production could increase through cultivation, fertilization, and irrigation to 7,100 lbs. per acre, if alfalfa alone would be grown. All acreages shown on Overlay 1A and 1B that will be cultivated could be subject to erosion, disturbance by ripping and plowing, compaction, and fertility losses depending on management. The degree of impact would depend on the kind of treatment, type of soil and management practices. Generally, Class I soils would be impacted less than Class II, which is less than Class III. This is due to the fact that Class I soils have less slope, are more suited to development, and are less fragile than the other classes of soils for this type of development. Each individual soil within a class has its own capability and limitations and will respond differently under various types of management. The major types of treatment influencing soils will be discussed in the following sections.

Construction

The entire soil profile would be severely affected on approximately 3 percent (3,330 acres) of the 111,015 acre farm area by construction of roads, settling ponds, ditches, and farm support facilities.

Under the proposed action, farms would be primarily located on Class I and II soils. There would be some instances where a particular farm unit would include a lesser amount of Class III soils and even isolated pockets of Class VI. Construction and farm support facilities are probably the greatest source of sediment yield from water erosion within the ES area. The amount of erosion would depend on soil class, however, since Class I has only 0 to 4 percent slope and runoff potential is lower compared to Class III at 0 to 20 percent slope. In areas where construction excavation was done for roads and farm support facilities, the natural soil profile could be irreversibly damaged and many soil properties changed. These changes could affect soil structure and reduce pore spaces, infiltration and permeability rates, and organic matter and nutrient levels. All these factors would increase soil compaction, lower the potential for revegetation, and thus increase the chances for soil loss through water and wind erosion.

Land Treatments

Approximately 97 percent of the acreage going into private ownership would be subjected to clearing, land leveling, ripping, tillage, planting, and harvesting. Each will impact the soil to varying degrees depending on the season and type of management.

Land treatment practices impact the soil in several ways. Removal of the natural vegetation combined with plowing, discing, or raking destroys the root zone. This root zone is very important in holding the surface soil in place and protecting it from water and wind erosion. If this manipulation is done when soil conditions are too wet, it would result in increased compaction and surface ponding or crusting. This may lower or slow down the germination of crop seed and thus reduce overall percent of crop vegetative cover. Wind and water erosion are directly related to percent vegetative cover. Wind erosion is most severe on sandy soils. When preparing sandy areas for planting, wind erosion will be a factor to consider. Cover crops, pre-wetting the soil by sprinkler irrigation, and/or over-wintering stubble are some ways to minimize wind erosion soil loss and improve air quality.

There may be some localized land leveling, more properly called reshaping, to prepare field areas for sprinkler irrigation equipment. The extent of impacts caused by this process is dependent upon the depth of the soil over restrictive horizons and the degree of profile development. Deep soils (Class I) with weak profile development would be least impacted by this action. Shallow soils (Class III) that are reshaped would have their productivity reduced by the amount of soil removed or increased somewhat by the addition of topsoil. Strongly developed soils (Class II) have distinct zones that serve specific functions for plant growth. Removal of the top soil and exposing subsurface horizons often results in decreased productivity in localized areas.

To disc and plow fields over an extended period of time would eventually degrade soil structure, decreasing soil pores, and create a plow pan, or compacted zone, just below the depth of plowing. This creates the need to deep plow or rip. Performing these operations during periods of high soil moisture increases compaction thus decreasing the effect of the treatment and increasing the potential for erosion.

Deep tillage and ripping breaks up layers restricting root growth. It increases rooting depths, improves permeability, and provides more soil pore space. The impact on soils is generally favorable but can cause problems when calcareous substratums are mixed with noncalcareous surface horizons or expandable clays. Mixing saline and/or sodic zones with other horizons may decrease productivity in local areas. This would be important when dealing with Class II and III soils.

Field manipulations such as seeding, harvesting, and fertilizing require the use of heavy equipment and would cause soil compaction. This problem is increased with higher soil moisture, the weight of the vehicle in relation to tire size, and the number of trips across the field. Minimum tillage practices on dry soils using vehicles with flotation tires would cause the least amount of soil damage.

The use of chemicals to control weeds and insects would have some slight short term impacts on the soil microflora and micro-organisms. These impacts would be minimal. Insecticides may help keep soils in a closer equilibrium with its natural state by controlling crop related diseases.

Crop Production

The production of crops will have either a beneficial or adverse impact on soils, depending on the type of management and crops used. Table 1-4, Chapter 1, outlines the percent composition of crops which will likely be used under actual farm conditions.

A rotation including row crops and small grains will modify the soil morphology to some degree. The production of row crops, where most of the plant is removed, would result in a general decline in soil organic matter. This reduction in organic matter would be reflected in the loss of natural fertility, a weakening of soil structure, a reduction of infiltration and permeability rates, and a reduction in aeration pore space. The net effect of these factors is a decrease of water entering the soil profile, thus, increasing the potential for soil erosion.

The production of small grain cover crops during winter months (double cropping) can have a beneficial effect on the soil if the stubble is plowed back into the soil. This will tend to increase organic matter content. Many of the soil properties will then be improved. However, if the stubble is burned, little or no improvement will occur.

Generally, a row crop small grain rotation done annually will maintain the soil at a constant level of production provided the green manure is returned back to the soil. Any alfalfa put into the rotation will have a beneficial effect on the soil and improve fertility.

Alfalfa has a symbiotic relationship with certain soil microbes. This relationship fixes atmospheric nitrogen into nitrates that the plant uses for protein. Along with alfalfa improving soil nitrogen, it also provides a year round cover crop, reducing soil erosion.

Erosion

Water erosion rates, shown in Table 3-1, were calculated from the Musgrave equation (Appendix 2-3) for the highest and lowest possible erosion condition for each capability class under row and cover crop conditions. Actual erosion conditions anticipated from development within the ES area are represented by the lowest rate for each soil class, based on recent farm developments on similar soils.

TABLE 3-1
ESTIMATED FUTURE EROSION RATES
FOR ROW AND COVER CROPS - TONS PER ACRE

Soil Class	Soil Erosion Condition	Row Crops	Mean Row Crops	Cover Crops	Mean Cover Crops
1	Low	0.03	0.96	0.00	0.03
	High	1.88		0.07	
2	Low	0.03	3.03	0.00	0.13
	High	6.02		0.26	
3	Low	0.33	13.82	0.10	0.74
	High	27.31		1.38	

SOURCE: Calculated from the Musgrave equation using 1.55 gm/cm^3 for soil density.

A study was made by the Idaho State Soil Conservation Commission to estimate the erosion rate of each area under Desert Land Application (DLA) and Carey Act (CA) application within the entire State of Idaho. This study was based on the use of sprinkler irrigation and covers all aspects of water erosion. Maps containing the location of applications and the anticipated erosion rate can be seen at the Idaho State Soil Conservation Commission (SCC) Office in Boise, Idaho. A summary map is being compiled by the SCC to summarize this data but is not presently available. However, present analysis shows that there are no severe erosion areas on Class I, II, and III soils within the ES area with a moderate potential for erosion. Most soils have a potential for a slight erosion rate.

Wind erosion will occur, particularly in the spring when the soil surface is bare. Wind velocities in the spring occasionally reach 20 to 35 mph and will cause wind erosion when soils are dry. Because little



FIGURE 3-1. Consequences of poor farm practices in the ES area. The top photo shows where gully erosion has developed due to excess irrigation water run-off from field at the top of the hill. In bottom photo, sand has deposited around the edge of a field due to spring wind erosion. This situation could be helped by measures taken to maintain some vegetative crop cover during early spring months.

data is available, the estimated wind erosion rates will vary from 0 to 15 tons per acre (see Appendix 2-4) with the average being near 2 to 3 tons/acre. Good management practices utilizing rotations of cover crops can effectively reduce wind erosion to 0 to 1 ton/acre. Poor management practices on sandy soils in dry years could have instantaneous erosion rates as high as 75 tons/acre in local areas.

Summary

Increases in soil production would occur on each acre put under cultivation with the use of irrigation, fertilization, weed control, and disease abatement procedures. The cash crop rotation of row crops and small grains will further increase the production return from these soils. Mixing the surface layers will occur as a result of cultivation, having only a minor affect on overall soil productivity.

An anticipated 3 percent of the area (3,330 acres) will undergo irreversible soil damage as a result of roads, settling ponds, and farm support facilities. Within these areas the entire soil profile will be altered.

Various land treatments would impact 100 percent of the area. Plowing, discing, or raking on 97 percent of the 111,015 acres will damage the surface root zone and would cause compaction within the profile. Damages will be greater if these practices are done during high soil moisture conditions, especially on moderate to fine textured soils. However, rotation of row crops during summer months and small grains in the winter would tend to maintain a certain degree of soil organic matter stability provided all green manures are returned back to the soil. This would maintain the soil fertility, percolation rates, soil structure, infiltration rates, and reduce potential erosion rates. Complete removal of crop stubble would deplete the soil of organic matter and cause faster soil depletion.

Soil erosion from irrigation and precipitation is estimated to be slight at less than two tons per acre in most areas. Wind erosion during spring months, when many fields are fallow and soils dry, will cause topsoil removal up to 15 tons per acre. Vegetative cover, organic matter and soil moisture will help prevent spring wind erosion. Good management practices would control soil erosion loss during windy periods.

WATER RESOURCES

Water Supply

The Snake River is the key to the economy of southern Idaho. Much of southern Idaho was settled by farmers who irrigated their farms with Snake River water. In the ES area the river is used for hydroelectric generation, recreation, habitat for many wildlife species, and incidentally for municipal/industrial uses. The major demand on Snake River water, however, remains agricultural.

TABLE 3-2 SNAKE RIVER FLOWS (CFS) WITH THE PROPOSED ACTION-
BASED ON AVERAGE FLOW

GAUGING STATION	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Lower Salmon Falls	7636	8404	9344	9054	9500	10221	10767	7268	6533	6293	6513	7283
Base Flow												
w/Prop. Action	7581	8404	9344	9054	9500	10221	10670	7065	6047	5745	6090	7048
Difference %	55	0	0	0	0	0	97	203	486	548	423	235
								3	7	9	6	3
King Hill	9353	10183	11041	10929	11283	12117	12851	8804	8029	7568	7846	8762
Base Flow												
w/Prop. Action	9329	10214	11071	10960	11315	12143	12775	8616	7559	7040	7449	8550
Difference %	24	+24	+30	+31	+32	+26	76	188	470	528	397	212
								2	6	7	5	2
C.J. Strike	9183	10392	11270	11229	11661	12637	13253	9140	7918	6736	6896	8071
Base Flow												
w/Prop. Action	9103	10425	11302	11261	11693	12658	13043	8663	7020	5782	6141	7654
Difference %	80	+33	+32	+32	+32	+21	210	477	898	954	755	417
								5	11	14	11	5
Murphy	9559	10739	11541	11481	11911	12857	13509	9312	8106	6926	7124	8420
Base Flows												
w/Prop. Action	9466	10761	11562	11502	11931	12868	13285	8819	7187	5951	6350	7987
Difference %	93	+22	+21	+21	+20	+11	224	493	919	975	774	433
								5	11	14	11	5
Brownlee (in flow)	14697	15623	19258	19284	22147	22521	26428	20325	17148	11304	10245	12344
Base Flow												
w/Prop. Action	14608	15621	19263	19306	22182	22531	26207	19481	16236	10519	9496	11523
Difference %	89	2	+5	+22	+35	+10	221	844	912	785	749	821
	1							4	5	7	7	7

SOURCE: Updated IDWR 48 year flow record
Critical Withdrawal Period

The proposed action would create a yearly demand of about 277,827 acre-feet of water to irrigate the 107,685 acres of new farmland. Approximately 90 percent (250,004 acre-feet) of the water needed would come from the Snake River. The remaining 10 percent (27,823 acre-feet) would come from groundwater sources in the Bruneau to Murphy region of the ES. (Refer to Chapter 1 for surface water/groundwater ratios, etc.).

The impact of diverting 250,004 acre-feet of water per year from the Snake River on existing water users in the area appears negligible. The new developments should not cause shortages for other irrigators for two reasons: 1) flows are sufficient to accommodate this diversion, and 2) mechanisms of the water right appropriation system would protect existing water users.

As Table 3-2 indicates, the actual reduction in flows would vary with the time of year. The irrigation season runs from April through October, with June, July, and August being the peak diversion months. Since August is usually the month of lowest flows in the river and is a period of high diversion, it can be considered a "worst case" example for examining flows remaining in the river after diversion. Since most of the diversion for the proposed action would be upstream from the gauging station at Murphy, (See Map 2-4) it is used as a common monitoring point. As Table 3-2 shows, the proposed action would reduce the average July flow at Murphy (based on 48 years' history) from 6926 CFS to 5951 CFS. This is a reduction in flow of 975 CFS. This is also illustrated graphically in Figure 3-1A.

Mean-flow reduction of 975 CFS at the worst case point (Murphy) would be about 14 percent of the average monthly flow. In a low-water year, such as 1977, the projected development would reduce mean flows as much as 22 percent. Table 3-3 depicts the effects of the proposed action on Snake River flows at Murphy during such a low-flow year.

TABLE 3-3. SNAKE RIVER FLOWS (CFS) AT MURPHY WITH THE PROPOSED ACTION - BASED ON LOW FLOW YEAR (1977), SHOWING MEAN LOW FLOWS AND ACTUAL LOW ONE-DAY FLOW FOR EACH MONTH.

	MAY		JUN		JUL		AUG		SEP	
	Mean	Low	Mean	Low	Mean	Low	Mean	Low	Mean	Low
Base Flow	6848	6000	6495	5120	5657	5270	6107	5660	6835	5840
w/Prop. Action	6355	5507	5576	4201	4682	4295	5333	4886	6402	5408
Difference	493	493	919	919	975	975	774	774	433	433
%	7	8	14	18	17	22	13	14	6	7

SOURCE: Water Resources Data for Idaho, 1977. USGS

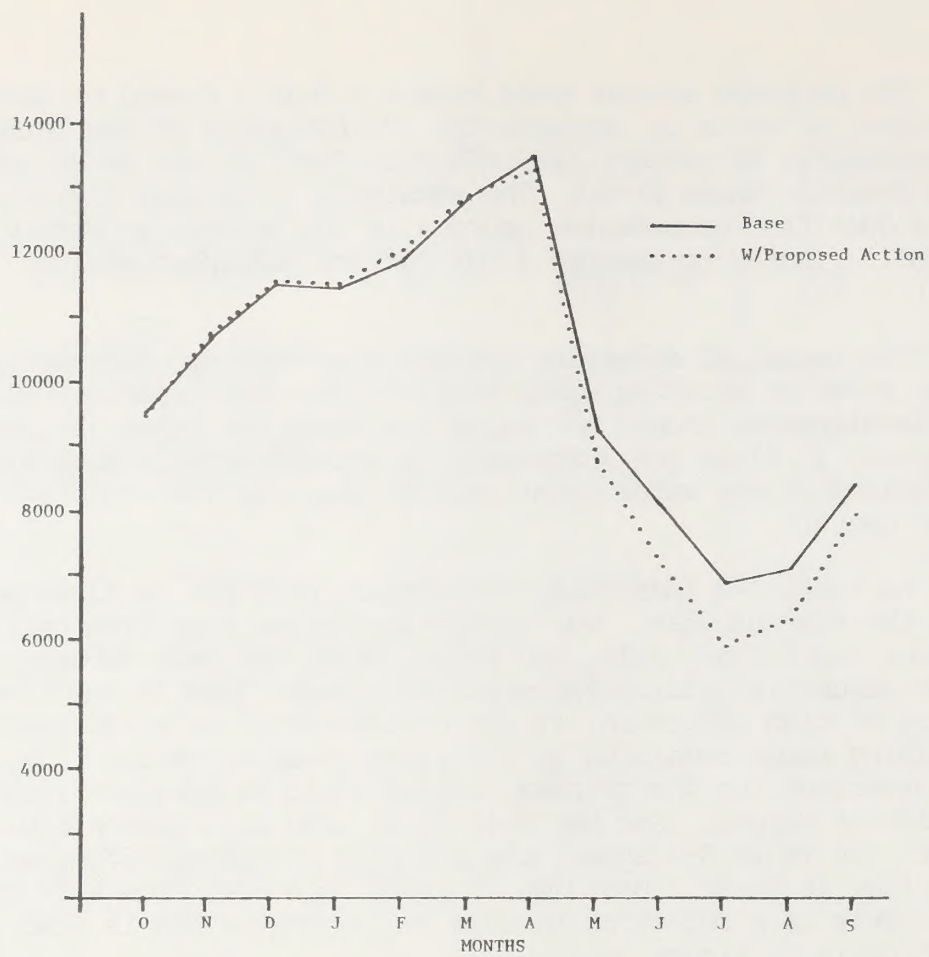


Figure 3-1A. Comparison of Snake River flows at Murphy, under base conditions and with proposed action (IDWR, 1979).

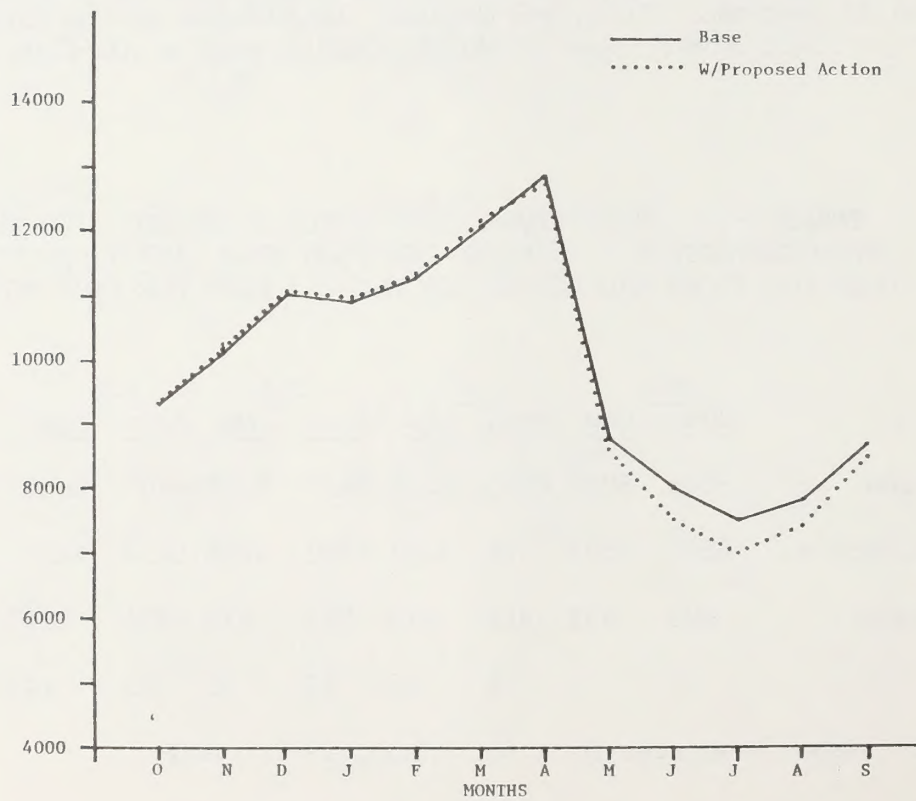


Figure 3-1B. Comparison of Snake River flows at King Hill, under base conditions and with proposed action (IDWR, 1979).

The Idaho Department of Fish and Game has recommended a minimum flow of 5500 CFS at Murphy. In average years, the development would not reduce mean flows below this recommendation. In low-flow years (such as 1977), however, the project would reduce mean flows as much as 17 percent below these recommendations. Also, in low-flow years the project would reduce flows to well below these recommendations for the entire period from late June through August.

The assumed 15 percent return to the river of irrigation water via infiltration to tributaries or the Snake River will be spread over about 10 months. Return flows from an applied 277,827 acre-feet will amount to about 70 CFS. As a proportion of remaining flow at Murphy this would be 1.3 percent of the mean flow in an average-flow year; 1.6 percent of the mean flow in a low-flow year (1977); and 2.1 percent of the low daily flow in a low-flow year (1977); all calculated on the basis of June flow.

It is possible that a coal-fired electric generating plant would be built to meet Idaho Power Co.'s increasing electrical demand. The facility would use about 30 CFS of water for cooling purposes. This water would likely be pumped from the Snake River. Considering the average flows of the Snake, even with the added irrigation consumption for 111,015 acres of new land (Table 3-2), this would be an insignificant flow reduction which would not impact water quality or fishery conditions beyond those estimates for the proposed action itself.

The 1978 Idaho Legislature established an average minimum flow of 3,300 CFS at the Murphy gage. The proposed action does not appear to reduce flows below this figure. The proposed action would be an incremental part in the continuing diversion of water out of the Snake River. The same can be said, to a much smaller extent, of the relationship of the proposed action to the downstream Columbia River System.

Groundwater withdrawals (27,823 acre-feet per year) are more difficult to assess than surface water because no reliable groundwater supply data are available. U.S. Geological Survey investigations show the likelihood that conflict between groundwater users in the Bruneau area currently exist. That is, in some instances one well is causing a lowering of the water table feeding a neighboring well. With this situation in mind, it seems reasonable to predict that in such areas new wells will lower water tables further. This creates additional costs for the farmer. Pumps may need to be lowered and/or wells deepened. Water must then be lifted higher at more expense. Flows may be diminished.

There may, however, be areas where sufficient groundwater is available and no user conflict would occur. It is acknowledged that not enough is known about the groundwater supply situation to predict impacts with complete accuracy.

As a result of continued irrigation, perched water systems would develop in localized areas. They may eventually flow and appear as seep lines on canyon walls or small saturated areas in topographic lows.

Impact Summary

In summary, impacts to municipal, industrial, domestic, agricultural, and other existing users would be slight. Except in low flow years the proposed action would not reduce the flow of the Snake below the Idaho Fish and Game recommended flow of 5500 CFS. It appears even in low flow years, it would not be reduced below 3300 CFS, the minimum flow set by the State Water Plan. Depletion of river flows would reduce downstream power generation. The degree of that reduction is discussed in the Energy section of this chapter. Other instream effects are discussed in the wildlife and vegetation sections. Groundwater impacts are largely unknown, but it is believed that well development would create water-use conflicts in some areas.

Water Quality

Accurate and precise quantitative estimates of water quality changes caused by the proposed action are not possible. Based on experience and knowledge of the personnel writing the water quality sections of the ES, the following quantitative representation of impacts are used throughout the analysis as follows: very slightly - 0 to 1 percent; slightly - 1 to 5 percent; moderate - 5 to 25 percent; heavy -25 to 50 percent.

Snake River

Temperature: In years of average flow or above, there would be no significant water temperature change as project irrigation withdrawals occur. Irrigation return water as infiltration which enters tributaries as groundwater would neither cool nor warm the main stem river. Summer maximum temperatures in tributaries are not warmer than the mainstream river at present.

In an extreme low-flow year like 1977, water temperatures could be expected to increase slightly in the river between C.J. Strike and Swan Falls Dams and below Swan Falls in July and August as a result of shoaling-the reduction of water depth with moderate change in wetted perimeter (see Fisheries section for impacts). This 1 to 5 percent increase would place the temperature regime further above the 18.8°C State Water Quality Standard for Class A primary contact recreational waters.

Turbidity: Between Hammett (below major inflows of existing irrigation return water and upstream of the ES area) and C.J. Strike Pool (the first large reservoir in which suspended materials which cause turbidity would settle out) turbidity would decrease very slightly in an average or high-flow year because of return of cleaner groundwater in return flows from the projected development (see Aquatic Vegetation section for impacts). Changes would be imperceptible below Strike. In low-flow years, turbidity would not change since the slight inorganic silt decrease would be offset by phytoplankton caused turbidity increases. (see Aquatic Vegetation section).

In average and low-flow years occasional accidents or intense storms would cause brief increases in turbidity, largely in the summer, as a direct result of the proposed action. In all years, wind borne sediments would tend to increase turbidity in the Snake River. The extent of these temporary increases is unpredictable.

Sedimentation: Sediment deposition would not change significantly in average flow years since bedload would be little affected by the approximately 975 CFS (10-15 percent of present flow) withdrawn for 99,879 acres of new farms using Snake River water. Sediment bedload movement will be greatest in the high-flow months of March and April, a period of very slight project water withdrawals. At the worst-case point--Murphy--proposed withdrawals in March and April would reduce base flows by +0.07 percent and -1.6 percent respectively. Reductions in flows in May and June would be 5 percent and 11 percent, respectively. In an extreme low-flow year such as 1977, high flows in March and April would be changed negligibly. In May and June of 1977 the flow reductions would have been 7 and 15 percent. It is expected that these flow reductions in a low-flow year would lead to slight increases in sediment deposition rates below Hammett (this relatively low-gradient area is below major inflows of turbid irrigation water returning from existing gravity irrigation projects upstream from the ES area) because slightly lower stream velocities would permit earlier settling of suspended solids which would have been carried downstream to settle in reservoirs (see Fisheries section for effects on white sturgeon). On the other hand, reductions in streamflow will also slightly reduce channel erosion, tending to reduce suspended sediment.

Occasionally, and with unpredictable timing, accidents or intense storms would bring sediment into the river bedload via tributaries as a result of the proposed action. Wind-carried sediments would increase slightly from project lands.

pH: No change in pH would occur in any reach during summer conditions in average or high-flow years. In extreme low-flow years, pH would increase very slightly but remain within Idaho Department of Health and Welfare (IDHW) standards.

Conductivity: Conductivity (as a reflection of dissolved solids) would increase slightly in extreme low and average-flow years between Hammett and C.J. Strike Pool as return flows in tributaries reach the river. Elsewhere, there would be less change.

Nutrients: In years of both average and extreme low-flows, a slight increase in nitrate would occur from Hammett to Strike Pool. The change would not be detectable below Strike Dam. Phosphorus would decrease very slightly in the ES area because of return of cleaner groundwater and re-entry of infiltrated irrigation water from the proposed action (see Aquatic Plants section for effects).

Occasional and unpredictable accidents and intense storms would carry sediments with adsorbed phosphates to the river via tributaries and wind as a result of the proposed action.

Light Penetration: In years of average flow, the very slight decrease in turbidity above Strike Pool caused by inflow of cleaner irrigation return water from tributaries, together with a slight to moderate decrease in average water depth in reduced streamflows, would permit more light to reach the stream bottom. The increase in light incidence at the stream bottom would be partially offset by increases in plant caused turbidity (see Aquatic Plants section for impacts).

Benthic Organisms: Benthic invertebrates, a food source of fish, would increase slightly in abundance per unit area in the Hammett-Strike area in response to increases in attached benthic algae and rooted aquatic plants (see Vegetation section of the ES) as light penetration to the bottom increases.

Oxygen/Ammonia: Ammonia levels would not change in average or low-flow years, as the capacity of the river to meet oxygen demands would not be taxed under projected organic loadings. Oxygen would remain near or at present levels in all reaches.

Bacteria, Heavy Metals and Pesticides: Bacterial abundance, heavy metals, and pesticides would parallel the changes in turbidity, declining very slightly in both average and low-flow years. The declines should be slightly greater above Strike Pool than below.

Pesticide concentrations in the Snake River throughout the ES area are a continuing threat to the aquatic ecosystem and human use of that system. The persistent chlorinated hydrocarbons pose the gravest danger, at least as far as present knowledge permits conclusions. Loadings of these materials to the river is principally from urban storm runoff and surface irrigation return flow. Subsurface irrigation return flows contribute very little to ambient pesticide levels.

Given the assumption that retrun flow to the river will be primarily subsurface and will not exceed 15 percent of the total water diverted, then returns to the river will be either from: 1) massive surface runoff occurring with major storm events, or 2) the more steady flows returning to the river via tributary streams or formerly dry draws. The occasional storm runoff will contribute measurable amounts of pesticides to the river. Chlorinated hydrocarbons should be contributed in an amount proportional to the ES area's role in total irrigated land in the basin. High levels of the persistent chlorinated hydrocarbon pesticides will probably occur in C.J. Strike pool but not downstream as a result of the proposed development. The other less persistent categories of pesticides (organic phosphates, carbonates) will probably not be detected to increase below the ES area even after major storm events.

The more steady return flows will enter the river as surface flows but only after having emerged in the draws and canyons from subterranean seeps. Water applied in sprinkler systems will enter the groundwater directly, then flow as underground flows toward the river, finally emerging as seeps in the canyons and draws. That underground residence time will allow for absorption and degradation of most contained pesticides, including the chlorinated hydrocarbons.

Tributary Streams

Water quality in the mostly intermittent tributary streams between Salmon Falls Creek and Bruneau arm of Strike Pool would deteriorate moderately. No base data are available for these waters. These streams appear similar to other better known tributaries in the ES area and on this basis temperatures in upper portions of these tributaries can be expected to decline slightly, then rise to near present levels in the lower reaches. Conductivity in these small streams would increase moderately as more salts enter with infiltrated return flows. Turbidity should decrease slightly to moderately; phosphorus would remain unchanged; and nitrate would increase heavily (see riparian vegetation impacts). Attached benthic algae would increase heavily as would benthic invertebrates. Plant production would be stimulated by inflow of nitrate and reduced turbidity, and because of the more stable flows resulting from groundwater return. Bacterial abundance would not change detectably. The above changes would all increase in magnitude in extremely low-flow years because groundwater return flow would then be a more significant portion of the available streamflow.

Occasional and unpredictable accidents and intense storms would carry eroded sediments with associated pesticides, heavy metals, and phosphates into tributaries via overland routes and wind. It is impossible to predict how much of these materials would remain in tributaries and how much would reach the main river (see Fisheries section).

Downriver From The ES Area

Between the lower end of the ES area below Homedale and the upper end of Brownlee Pool (about 55 miles), the effects discussed previously for water quality would extend for only about 16 miles before inflows from major tributaries (Malheur, Boise, Owyhee Rivers) would make project-caused water quality changes indiscernible. All water quality effects would disappear below Brownlee Pool, since Brownlee Pool acts as a nutrient and sediment trap.

Groundwater

Deep movement of water from irrigation to the regional water table is likely to be insignificant for several reasons: 1) The depth to

static water level is generally greater than 200 feet over much of the project lands; 2) the geologic units in the unsaturated zones tend to have higher horizontal than vertical conductivity; and 3) much of the area is underlain by low hydraulic conductivity clays and shales. Deep recharge will only be in those few areas of near-surface permeability, i.e., surface gravel beds, fractured rhyolite outcrops, and folded/faulted basalt outcrops which would channel subsurface flows downward.

The predominant impacts from the creation of local perched groundwater systems would be the formation of small seep and spring areas in topographic lows and at the base of gravel units along the canyon of the Snake River and its tributaries. Most of these discharges would be small and would form only wet areas. However, some surface flow would occur in tributary channels.

Available data indicate that there would be no return of surface water to the deeper underground aquifers and, therefore, no change in existing quality (Ralston and Chapman 1969, Ralston and Chapman 1970). It is possible that there may be some exchange between aquifers when a well passes through two or more.

The small amount of surface water that percolates through the soil horizons and forms perched water tables would carry fertilizer residues with it. This water table would be high in nitrogen and would contain some phosphate. It may also contain pesticide residues. This water may emerge as seeps or springs on hillsides, and some may eventually be used as well water sources. In either case, it is not possible to quantitatively evaluate the quality of this water and its impact on potential uses.

Impacts Unique to the Proposed Transfer Methods

Disposal of land under the Carey Act would have slightly less effect on the aquatic environment than disposal under the Desert Land Act if the land under private ownership remains in small family holdings. Smaller acreages lead to greater crop diversification in a given area and increased numbers of fence lines and edge vegetation which impede wind and runoff from intense rainfall or pipeline accidents. This also reduces the need for very large settling ponds to minimize silt movement to neighboring properties. Accidental water discharge or rainfall or pipeline accidents leading to runoff would tend to involve less water concentration than would be the case in larger acreages. This is because erosive power of water rises exponentially with increased flow.

Since sedimentation from surface runoff (rainfall, wind, or accident-related) tends to carry adsorbed pesticides, heavy metals, and phosphorous, conversion of public land under the Carey Act should reduce the volume of these problem materials arriving in tributaries or in the Snake River. However, under the CA more farm lands would lead to potential increases

in accidental or careless dumping of petroleum waste, pesticide containers, and compounds bearing heavy metals in channels for possible transport eventually to the Snake River. The merits of sediment decreases from small ownerships probably outweigh the disadvantages of accidental compound spills.

Impact Summary

Nitrates and conductivity (as a reflection of dissolved solids) would increase moderately in tributary streams. Turbidity and temperature would decrease moderately in these streams. Water temperature in the main Snake River would increase very slightly as a result of reduced water depths. Nitrates and conductivity in the ES area of the main Snake River would increase slightly above C.J. Strike. Turbidity would decrease in the same area very slightly. Occasional accidents caused by breakage in water-delivery systems, intense storms, or wind would bring sediment to tributaries and the main Snake River, with adsorbed fertilizer residues and toxic materials. Magnitudes are not predictable. Benthic invertebrates would increase slightly in density in response to slight increases in attached plant density, but this will be offset by losses of wetted areas in reduced summer flows.

Conclusion: the overall effect of the project action will be a very slight decrease in water quality in average years. In a low flow year there will be a slight decrease in quality.

VEGETATION

Terrestrial

The 439,303 acres of public land within the ES area consists of approximately 275,583 acres of sagebrush/grassland, 87,085 acres of seeded grassland, 42,810 acres of salt-desert shrub/grassland, and 33,825 acres of natural grassland. Overall, the current vegetation is in relatively poor range condition.

Under the proposed action, approximately 47,285 acres of sagebrush/grassland, 33,090 acres of seeded grassland, 14,430 acres of salt-desert shrub/grassland, and 16,210 acres of natural grassland would be cleared over a 5-year period in preparation for agricultural development.

These 111,015 acres of range vegetation would be replaced by approximately 23,691 acres of potatoes, 22,615 acres of dry beans, 18,306 acres each of winter wheat, barley, and sugar beets, 6,461 acres of alfalfa, and 3,330 acres devoted to non-crop land uses (based upon assumed crop rotations).

An additional 37,000 acres of public land would be reserved as public purpose tracts to facilitate agricultural development. Approximately 18,000 acres of this would be designated as wildlife leave areas, and the present vegetation would not be removed. The other 19,000 acres

would be subject to clearing, to provide public purpose facilities as needed.

This extensive vegetation change (see Map 2-5 and Overlays 1A and 1B) would in turn impact other resources such as recreation, wildlife, and livestock grazing. Refer to these sections for impact analysis.

Riparian

There are approximately 55 miles of riparian vegetation on public land within the ES area. Under the proposed action, approximately 1.5 miles of this would be subject to removal (see Map 2-5 and Overlays 1A and 1B).

Possibly offsetting the destruction of riparian vegetation would be the stimulation of increased riparian growth as infiltrated irrigation water reaches stream courses and increases wetted stream margins. Higher nutrient levels in the return water would also stimulate riparian growth.

Aquatic

Quantifying terms used in the following section are defined as: very slightly - between 0 and 1 percent; slightly - between 1 and 5 percent; moderately - between 5 and 25 percent; heavily - between 25 and 100 percent.

Phytoplankton:

Phytoplankton blooms would be slightly longer lived, but total live weight would be unchanged above Strike Pool in an average-flow year. Below Strike there would be no change in phytoplankton. Phytoplankton concentrations in extreme low-flow years would increase moderately below Strike Pool as a result of a longer period of residence in the river. Increases in phytoplankton would tend to increase turbidity and BOD downstream (see Water Quality section).

Attached Benthic Algae and Rooted Aquatic Plants:

Because of a very slight decrease in turbidity and increase in light incidence at the bottom due to decreased stream depth, attached benthic algae and rooted aquatic plants in all flow years would increase slightly above Strike Pool and would increase very slightly in deeper water in the Snake arm of Strike Pool. Between Strike and Swan Falls Pools and below Swan Falls, the increase would be slight to moderate since these shallower bottom areas receive more light. In low-flow years the increases would be moderate. The increases would be beneficial as noted in the Benthic - Invertebrate section.

Effects of Different Land Disposal Methods

Accidental arrival of sediments, heavy metals, pesticides, and plant nutrients from ES land into tributaries and the main Snake would be less under CA disposal than DLA. Thus, there would be less likelihood that pesticides and heavy metals would be bound up in aquatic plant tissue for later concentration to invertebrates, fish, and bald eagles.

Threatened and Endangered Plants

Table 3-4 shows information on known sites of the four species regarded as threatened or endangered within the proposed action area. As required in the Endangered Species Act of 1973, these plants will be protected and preserved. Any similarly classified species found in the ES area through future studies will also be protected. No development would be allowed where threatened or endangered plants are found. These plants, therefore, would not be impacted by the proposed action.

Impact Summary

Overall, the proposed action would create a major change in terrestrial vegetation on approximately 130,015 acres in the ES area. About 107,685 acres of this would be replaced by agricultural crops, and up to 22,330 acres would be cleared for non-crop land uses.

Approximately 1.5 miles of riparian vegetation would be lost. This would be offset, however, by stimulation of riparian growth due to higher nutrient levels in the water and by infiltrated irrigation water reaching drainage areas which are presently dry.

Under the proposed action, there would be a slight increase in bloom life of phytoplankton especially above C.J. Strike Reservoir. Attached benthic algae and rooted aquatic plants in the Snake River would be expected to increase slightly in abundance.

No impacts to threatened or endangered plants would be allowed to occur as required in the Endangered Species Act of 1973.

WILDLIFE

Terrestrial

Implementation of the proposed action could result in the loss of existing natural vegetation on up to 130,015 acres (111,015 acres for farms and up to 19,000 acres for public purpose tracts not used for wildlife leave areas). Consequently, most wildlife species that inhabit the ES area would experience habitat loss. For animals such as pheasants, Hungarian partridge, and Valley quail, new habitat would be created as new agricultural land is developed near existing natural vegetation.

TABLE 3-4
 THREATENED AND ENDANGERED PLANT SITES WITHIN
 THE PROPOSED ACTION AREA

Common Name	Current Status	Approximate total area of sites in Proposed Action	Approximate percent of known Idaho population occurring under Proposed Action	Approximate percent of known Idaho population occurring within ES area
Murphy milkvetch	candidate for Idaho's Endangered List. May be proposed to the Federal Register of Endangered Plants	1110 acres	2%	15%
Mourning milkvetch	candidate for Idaho's threatened list	35 acres	1%	5%
Matted milkvetch	same as above	120 acres	10%	50%
Large flowered gymnosteris	same as above	25 acres	30%	50%

SOURCE: Threatened and Endangered plant inventory and study, 1978, BLM.

This would create an edge, or ecotone, thereby increasing habitat diversity. Increased habitat diversity leads to increased wildlife diversity. However, acre-per-acre, large continuous agricultural projects provide less edge effect than smaller farms. As a result, wildlife species would be less abundant on large agricultural development ecotones than on the smaller farm units.

As part of the proposed action, BLM would set aside about 18,000 acres of isolated wildlife tracts among the 111,015 acres of new farmland. The selection criteria BLM would use is discussed in Appendix 1-1. These isolated tracts would provide year-round habitat for upland game birds. They would be primarily used by pheasants during winter and spring periods for shelter, feeding, and nesting when adjacent farmland is not useable for these needs.

In many areas, loss of habitat would result in displacement or destruction of the particular local population of concern. Because mobile animals can move to adjacent areas of suitable habitat does not necessarily indicate that the new habitat would be able to support the animal. In most cases certain habitats would already be occupied by as many animals as that habitat can support. The addition of more animals results in a decreased survival rate for that population. Therefore, habitat loss eventually leads to overall population decreases.

As discussed in Chapter 2, life forms have been assigned to all animals breeding within the ES area. These life forms are useful in illustrating impacts. If part or all of a species life form is lost due to implementation of the proposed action, population decreases and displacement of that species would occur. The most adversely impacted life forms are those in which the animal reproduces on the ground or in shrubs.

The effect of pesticides on terrestrial animals near farming areas has also been considered. Appendix 9-1 lists the major pesticides commonly used in the ES area. These pesticides are put on cropland to control insect infestations and weed competition. The table gives the oral lethal dosage (LD₅₀) of each pesticide for rats in a controlled laboratory situation. This is a relative indication of toxicity of the various pesticides. There are other factors that relate to dangers of a particular pesticide, but the lethal dosage is considered to be a major indicator.

As can be observed from the tables, insecticides, as a pesticide group, are more toxic than herbicides. All but one of the insecticides are organophosphates, which are characterized by high toxicity, but short half lives. This means that these compounds do not persist in the environment for long periods. They therefore do not present a long term hazard to penetrating into the wildlife food chain. In addition, the potato insecticides are put under the soil which puts this group out of reach of most wildlife species.

Of all the pesticides listed in Appendix 9-1, Parathion, probably poses the greatest danger to wildlife. It is an organophosphate with a short half life. However, this chemical is sprayed on alfalfa, sometimes with aircraft, which means much of it may drift off the target field before it reaches the ground. This chemical may cause direct mortality to young pheasants by skin contact, but apparently does not cause major losses in adult birds (Messick et al., 1974).

It is impossible to predict in definitive terms, what long term impacts these chemicals have on wildlife species. The use of pesticides has substantially increased in the last decade, which is a major reason for the continued increase in crop yields throughout our nation.

Mammals

Big Game:

Mule Deer: A total of 1,300 acres of existing vegetation has been proposed for conversion to agriculture within the mule deer winter range shown on Map 2-6. This accounts for approximately 9 percent of the total winter range acreage which lies within the ES area.

Mule deer using these areas during the winter depend upon the vegetation to provide food and cover. Loss of vegetation, primarily shrubs such as sagebrush, bitterbrush, and serviceberry, would result in a reduction in the cover and nutritional source which is important to these animals.

Because this wintering area could not support as many animals as it could prior to agricultural development, these deer (an estimated 40 to 60 animals, or 8 to 12 percent of the deer population using this winter range within the ES area) would be displaced, and the population would subsequently be reduced within the winter range.

Human activity associated with farm operations would increase, resulting in additional stress to these deer. This stress factor is especially critical to the survival of weak deer and fawns. Predators are able to catch weakened deer much easier, and disease becomes a more significant mortality factor. Fences would tend to restrict some deer but would not block major migration routes.

Other mule deer not using the above mentioned winter range are scattered throughout the ES area and are quite limited in numbers. They would not be adversely effected by the proposed action. These deer would benefit from plantings of alfalfa and cereal grains which would increase their food base.

Pronghorn: Pronghorn antelope populations are limited within the ES boundary, and since very few areas actually are occupied by antelope, impacts to these animals would be slight. Establishing cereal grains and alfalfa would be beneficial to antelope. However, fences around the perimeter of agricultural projects could become barriers to pronghorn movement if adequate passage specifications are not met. Also, any increased human disturbance would have detrimental impacts. This would probably force the few animals that inhabit the area to move away from the agricultural developments.

No migration routes are identified in the area and subsequently none are expected to be impacted by the proposed action.

Small Game:

Mountain Cottontail and Pygmy Rabbit: The mountain cottontail prefers talus slopes and riparian habitat. Because this type of habitat is not suitable for agricultural development, rabbits would not be adversely impacted by the proposed action. In areas where agricultural development borders on rocky canyons and riparian habitat cottontail populations could be expected to increase due to the additional vegetative diversity that would be created.

Pygmy rabbits are strongly tied to dense sagebrush stands which comprise approximately 275,583 acres within the ES area. Agricultural development resulting in clearing this vegetative type would displace and subsequently reduce pygmy rabbit populations and about 47,285 acres of their habitat (see Vegetation section).

Predators and Furbearers: Predators and furbearers (with the exception of the coyote) are most often associated with the riparian habitat type. Because this habitat type is not jeopardized by proposed agricultural development, impacts to these animals would be minimal. Many of these animals, such as short-tailed weasels and spotted and striped skunks, are often found in areas near agricultural land for this reason. Small population increases could be expected due to increases in agriculture.

The coyote which commonly occurs in the shrub/grassland habitat (comprising approximately 318,393 acres within the ES area) is also quite adaptable to agricultural areas. For this reason a slight increase in coyote numbers could be expected in some areas. However, an increased number of coyotes would probably be killed by farmers and other people due to an increase in roads and human encroachment in the area. Overall, numbers should remain close to the same.

Non-game:

Removal of native vegetation in order to initiate agricultural development would adversely affect a number of non-game mammals. Species composition and population numbers of these types of animals would be

altered by an increase in agricultural practices. Most of the mammals impacted are important prey for predatory mammals and birds. Clearing land of native vegetation, especially the shrub/grassland habitat type, would eliminate existing non-game mammals in that area. Some rodents would reinvade agricultural areas when sufficient cover exists. Wolfe (BPNA Annual Report, 1976) found that a "planted wheat field south of the (Snake) river did not contain any rodents until the wheat grew high enough to provide cover. The ubiquitous deer mice then moved into the interior of the field. Later in summer, meadow voles colonized the field under large diameter irrigation feeder pipes. By fall, deer mice had established a large breeding population." Ord's kangaroo rats are also known to utilize peripheral areas of cultivated fields where rangeland is adjacent and sufficient cover exists. Although irrigated wheat fields would attract certain rodents as pointed out above, their value as prey species is greatly reduced. The yearly schedule of this prey availability is an important consideration. Even though irrigated wheat fields would attract breeding deer mice and meadow voles, by the time this happens the wheat has grown to a height which effectively renders them invulnerable to predators. By then the critical raptor breeding season has passed before the interior of these fields can yield prey. It is also important to note that deer mice and Ord's kangaroo rats are nocturnal and are not normally available to diurnal raptors as prey items.

Non-game mammals which would be eliminated by conversion of rangeland to agricultural land include the black-tailed jackrabbit, Great Basin kangaroo rat, sagebrush vole, whitetail antelope ground squirrel, Townsend ground squirrel, and the Great Basin pocket mouse. All of these species are an important prey source for various mammals and birds and for this reason would present an adverse impact to these predatory animals.

Upland Game Birds:

California Quail: The overall impact to California quail may be slightly beneficial. These birds are most often found associated with irrigated agricultural areas. For this reason, increased agricultural development could help quail populations as long as adequate areas of the shrub/grassland habitat type are left undisturbed adjacent to the agriculture.

Riparian vegetation within the ES area is limited, but where it occurs it usually supports quail populations. Increased agricultural development in these areas would adversely impact these birds. One such area is Foreman Reservoir. Development here would probably reduce existing populations.

Where water developments such as ponds, detention dams, and streams exist or are built on new agricultural land adjacent to the shrub/grassland type, California quail populations could be expected to increase.

It is expected that some new riparian habitat would be created in drain-ages down slope from farming areas due to seeps from percolated irrigation water.

Bobwhite Quail: Due to the limited distribution and numbers of this bird, agricultural development would have no impact to this species.

Hungarian Partridge: Where the shrub/grassland habitat is intermingled with irrigated agricultural development, Hungarian partridge would be beneficially impacted and populations would have the potential to increase.

Chukar Partridge: The habitat requirements of the Chukar are such that they do not conflict with proposed agricultural developments. For this reason Chukars would not be affected by the proposed action.

Mourning Doves: Mourning doves inhabit both grassland and the shrub/grassland habitat types. Agricultural development which converts this type of vegetation would adversely affect breeding birds. When the land is cleared of natural vegetation, doves would lose necessary nesting, hiding, and thermal cover. However, agricultural areas adjacent to natural vegetation would provide new water developments which would increase local dove populations. Overall, dove populations would be expected to increase.

Pheasants: Pheasants occurring in the ES area are tied to riparian vegetation and irrigated agricultural areas adjacent to natural vegetation. Large tracts of agricultural development not interspersed with the shrub/grassland type offer no year-long cover for pheasants. For this reason they support very low populations. New irrigated agricultural areas which offer natural year-long vegetation and a source of water would support new populations. Pheasant numbers could be expected to increase if these types of developments were initiated. No existing populations would be lost due to increased agricultural development.

With adequate protection, and in some cases water and vegetation enhancement, the wildlife tracts that are identified for retention in the proposed action would provide important habitat for pheasants. These wildlife tracts would be strategically located to allow good distribution of habitat throughout the agricultural area. Tracts would be selected on the basis of values. These selection parameters are listed in Appendix 1-1.

Once the tracts are selected, they would be managed for their habitat values under the "Sikes Act" cooperative management program with the Idaho Department of Fish & Game, the Intermountain Station of the Forest Service, and the BLM. Existing habitat felt to be adequate for wildlife food and cover would be protected. If selected tracts did not have adequate vegetation for food or cover, revegetation efforts would be made to improve conditions. Water would be developed on strategic tracts.



FIGURE 3-2. Example of established permanent vegetation cover that offers nesting habitat for pheasants on isolated wildlife tracts near agriculture.

FIGURE 3-3. This isolated tract has been fenced to keep livestock out, which allows native vegetation to mature without grazing pressure.



FIGURE 3-4. End results of the isolated tracts program as part of the proposed action farm development.

It is believed that viable populations of pheasants, Hungarian partridge, and other agriculturally orientated species would successfully occupy these isolated tracts and the surrounding agricultural land.

Sage Grouse: Sage grouse within the ES area are highly dependent upon sagebrush in order to survive. Land clearance would have a severe impact on these birds. Clearing the land of sagebrush would destroy one strutting ground, feeding areas, nesting sites, and thermal and hiding cover. Increased human activity due to increased agricultural development in the vicinity of three other strutting grounds would disturb sage grouse using these areas. They would be displaced and their reproductive performance could be reduced. Populations occurring in these areas would suffer severe population reductions.

Sage grouse strutting ground number 7 is located in the middle of proposed agricultural development (see Map 2-6 with Overlay 1B) and would be destroyed should development occur. In 1967, forty male sage grouse were seen on this ground. Gill (1965) reports that 78 percent of 23 nests located in Colorado were found within one mile of a permanent strutting ground and 87 percent of the nests were within two miles of a strutting ground. This area also supports sage grouse during the winter; 40 to 50 birds were seen in this area in January of 1978.

Agricultural development in this area would destroy this strutting ground which is critical to the sage grouse breeding cycle. It would also destroy approximately 1,000 acres of important nesting and wintering habitat. Since strutting grounds, nesting habitat, and wintering habitat are crucial to a sage grouse population, sage grouse numbers in the area could decrease from 20 to 50 birds.

Waterfowl: Impacts to waterfowl would be both adverse and beneficial. As pointed out in Chapter 2 islands in the Snake River offer important nesting habitat for both ducks and geese. These islands provide good nesting cover and security from terrestrial predators and disturbance. This nesting security may be jeopardized should the proposed agricultural development occur. Low flows in the Snake River (resulting from an increased irrigation demand) could create land bridges between islands and the mainland thus allowing more extensive predation and disturbance to the nesting waterfowl. This adverse impact would result in decreased waterfowl production.

In addition, agricultural development in the immediate vicinity of Foreman Reservoir would adversely impact nesting waterfowl there. Cinnamon teal, mallards, redheads, and ruddy ducks are observed here during the breeding season. Agricultural development adjacent to this reservoir would result in removal of approximately 20 acres of existing riparian vegetation which is so important for nesting cover used by these birds. Human disturbance would increase in the area which would also adversely affect nesting birds causing them to abandon nests or keeping them from initiating nesting in this area. The above impacts would cause the relatively small numbers of waterfowl using this reservoir for

breeding to be significantly reduced or totally lost. Waterfowl using this area during the nonbreeding season would benefit by plantings of cereal grain crops in close vicinity to the reservoir, but this would not compensate for the loss of breeding birds due to agricultural development. Birds using Morrow Reservoir during the nonbreeding season would also benefit by agricultural development.

Cereal grain crops associated with agricultural development adjacent to the Snake River would be very beneficial as winter feeding areas to Canada geese, snow geese, Ross geese, mallards, pintails, and American wigeons. An estimated 36,614 acres of cereal grain crops would be grown each year under the proposed action. As a result of this increased waterfowl habitat an increased number of these birds would frequent the ES area and would possibly stay in this area for a longer period of time during their migration. New ponds and detention dams built due to agricultural development would be beneficial to waterfowl as loafing areas.

Raptors: Nesting birds of prey within the ES area would be severely affected by agricultural development. Hunting habitat lost due to land conversion as well as increased human disturbance to nesting raptors in newly developed agricultural areas would adversely impact these birds.

Because most raptors in the area nest among rocky cliff areas which are not suitable for farming, actual nest sites for most raptors would not be jeopardized. However, there are four species of raptors in the ES area which are primarily ground nesters: short-eared owl, burrowing owl, marsh hawk, and ferruginous hawk. Most nesting attempts of these birds would fail.

Increased disturbance to nesting raptors would result in added physical stress to these birds. This would also act to lower overall production and survival rates.

Factors leading to increased disturbance to nesting raptors in the ES area due to agricultural development include: 1) increased road development; 2) greater amount of human activity; and 3) increased number of pumping sites on the Snake River.

Any of the following problems could be encountered when increased disturbance to nesting raptors takes place: 1) the parent birds may become so disturbed that they desert their eggs or young completely; 2) the incidence of egg breakage or trampling of young by parent birds may be increased, as may the chances of cooling, overheating, loss of humidity, and avian predation of eggs; 3) newly hatched birds may be chilled or overheated and may die in the absence of brooding; 4) older nestlings may leave the nest prematurely, damaging feathers and breaking bones at the end of futile first flights. Unsuccessful flights may force them to the ground where they become highly vulnerable to predation. The Birds of Prey Natural Area Annual Report by Peterson and Stewart (1976) reports that "A nesting site readily observed and easily accessible to humans will usually fail. Generally, re-nesting attempts in the same vicinity will also fail."

The prey species used by most birds of prey are chiefly dependent upon native rangeland. Beecham and Kochert (1975) believe that "while ring-necked pheasants formed an important part of the food brought to nests by eagles in agricultural areas, jackrabbits and cottontails still predominated, suggesting that eagles are dependent on lagomorph (rabbit) populations. The extensive monocultured irrigation projects, characteristic of DLE projects in Idaho, could result in a decrease in lagomorph densities with eagle density also decreasing." Previously discussed in the section "non-game mammals" was the fact that certain valuable prey species used by raptors would be lost or displaced due to agricultural development. It is also important to reemphasize the fact that prey species inhabiting irrigated fields would not be vulnerable to nesting raptors (during the critical time when young are developing) due to dense vegetation.

As a result of increased agricultural development the amount of land that is utilized primarily for raptor hunting areas would be significantly reduced. Raptors would be forced to extend their foraging areas and spend an increased amount of time and energy in obtaining food for themselves and their young. At some point the energy return to these birds would be lower than the amount of energy expended to obtain their food. Their energetic demand would not be met thereby lowering reproductive success and survival rate. Production would decrease.

An increase in the use of pesticides and herbicides would probably accompany increased agricultural development. The occurrence of persistent toxic chemicals in many raptorial birds has been directly linked to decreased reproductive success (Hickey 1969). Because raptors are at the end of the food chain and are long-lived, they can accumulate large loads of these chemicals (Anderson et al. 1969, Keith 1970). Enderson and Berger (1970) showed that high pesticide residues in prairie falcon egg contents, eggshell thinning, and pronounced hatching failures are correlated events. Occasional accidents or intense summer storms may cause overland water flows which could carry pesticides or heavy metals into the Snake River. These pollutants could reach the bald eagle via concentration in plants, invertebrates, and fish.

While increased agricultural development would adversely affect most nesting birds of prey in the proposed area, two breeding raptor species could be beneficially affected by this type of land use. Barn owls often live in close association with man and use man-made structures (such as deserted buildings, silos, wells and water towers) for nesting sites. For this reason increased development could provide new barn owl nest sites leading to population increases in this area. Likewise American kestrels often utilize agricultural areas for hunting territories, taking advantage of high insect populations. As a result this raptor species could also benefit from increased agriculture.

During the winter, rough-legged hawks and marsh hawks often utilize agricultural areas for hunting territories and these hawks may benefit from increased agriculture during this season. As stated above marsh hawks would be adversely impacted during the nesting season.

Other Non-game Birds:

Non-game birds severely impacted by loss of habitat due to agricultural development include species which are closely tied to the shrub/grassland or grassland habitat types for nesting or feeding. Some of these birds were mentioned in Chapter 2 and are listed by life form in Appendix 2-7. On the other hand, increased agricultural development would lead to different bird species and increased numbers of these birds. Birds which would show an overall increase in numbers due to increased agricultural development are species such as house sparrows, blackbirds, starlings, and barn swallows. Life forms 6 and 17, shown in Appendix 2-7, list those non-game species expected to increase.

Birds dependent upon the native desert/range habitat would show population declines should agricultural development occur. Aesthetically, these birds are pleasing to many people, and their population reduction would be a severe impact to this portion of the public. In addition, non-game birds could be an important prey source to raptors when rodent populations are low. Therefore, these birds act as an important buffer prey base. A decrease in their numbers could lead to decreased raptor production in years when rodent populations are low.

Riparian areas (totalling 55 miles on public land within the ES area) are also important to passerine (non-game) birds as nesting, feeding, and cover areas. Agricultural development around Foreman Reservoir (riparian area) would act to reduce non-game bird populations in this area. This area offers a good variety of habitat and supports a great diversity of breeding birds. Species such as warblers, flycatchers, and woodpeckers would be affected due to habitat destruction and increased human disturbance in this area. As previously mentioned there could be some new riparian habitat created downslope from agriculture areas where seepage resulted from irrigation water percolation.

Reptiles and Amphibians:

Because reptiles and amphibians have small home ranges and are very specific in their habitat requirements, species dependent upon the shrub/grassland habitat type would be severely affected. Species such as the Great Basin spadefoot toad, Western whiptail lizard, desert horned lizard, striped whipsnake, western rattlesnake, and the western ground snake would show an overall reduction in numbers.

Increased human activity and numbers of roads would lead to an increased level of reptile mortality due to direct persecution and road kills.

Because reptiles and amphibians constitute a partial prey base for some birds of prey (such as red-tailed hawks) as well as other predators, a decline in their numbers would force these predators to change their hunting habits. For this reason, an increased level of physical stress and energetic demand on these predators would result and numbers and production would decrease.

Sensitive Species:

Spotted Bat: Specific locations of spotted bats in the ES area are not known, but their distribution falls within the boundaries of this area. Because water developments would increase with increased agricultural development, more feeding areas would be available for this species. An increase in buildings, which are occasionally entered by spotted bats, would also be of benefit to these animals. Therefore, increased agricultural development would not present an adverse impact to this species and in some respects beneficial impacts would result.

River Otter: River Otters are tied to an aquatic habitat. Therefore, land conversion due to agricultural development would not directly affect this species. River fluctuations would not be significant enough to impact the otter. Principle fish species utilized for food by otters are not expected to be reduced by the proposed action.

Bobcat: Bobcats are most often found in areas which are not suitable for agricultural development, but they may range widely and need brushy areas for cover and hunting. For this reason, proposed agricultural development locations in the vicinity of rocky or canyon areas would adversely affect the bobcats range. In those areas the bobcat would find it hard to obtain a sufficient amount of food to survive, overall production would be reduced.

Another adverse impact to bobcats arises from human disturbance, causing stress to this solitary species. An increase in bobcat trapping pressure would also result due to increased human activity and easier human access to areas where bobcats exist. The above impacts would act to reduce bobcat populations in the ES area.

Mountain Quail: Very little proposed agricultural development occurs in the range where mountain quail exist in the ES area. There are two proposed agricultural development "units" which border on the King Hill Creek mountain quail range (see Map 2-6 with Overlay 1B). Therefore, land conversion resulting in brush removal in these "units" would prevent these birds from expanding their range and would put a limit on the total population.

Increased human activity and improved access to the area would tend to increase hunting pressure and stress on these birds. This could reduce their numbers.

Osprey: The osprey is tied to an aquatic habitat and needs trees for perch sites. For this reason little or no impact would result to ospreys since little or none of the riparian habitat on the Snake River would be disposed of for agricultural development. However, as with the bald eagle, occasional accidents and intense summer storms would bring pesticides and heavy metals into the aquatic food chain for eventual concentration in osprey tissue.

Merlin: Only 1.5 miles of existing riparian habitat would be lost due to agricultural development. For this reason merlins would lose only a small amount of trees for perch sites and hunting areas. An

exception exists at Foreman Reservoir where proposed agricultural development threatens a small amount of riparian vegetation. Therefore, a reduction in merlin habitat would occur, resulting in decreased use of this area. As previously mentioned birds of prey, such as the Merlin, are quite sensitive to human disturbance. Increased agricultural development adjacent to riparian areas, such as Foreman Reservoir, would increase human disturbance and incur stress to this species. This could result in displacement and decreased survival rates for merlin.

Merlins could be slightly beneficially impacted from agricultural development by the development of trees along irrigation waste water drainages and around detention dams and ponds which would create additional roosting and feeding areas.

Ferruginous Hawk: Ferruginous hawks using the ES area for hunting and nesting would be severely impacted. Howard and Wolfe (1976) state that, "Unless modified to meet the hawks' biological requirements, the conversion of extensive tracts of native vegetation into monotypic stands--either as the result of large-scale brushland conversion programs or intensive agriculture--may reduce their densities and reproductive success due to: (1) increased disturbance; (2) loss of nesting sites; and (3) reduction of major prey populations."

"During the incubation period ferruginous hawks appear sensitive to human activity, and even slight disturbances may cause nest abandonment (Olendorff, 1973)." He also points out that "Ferruginous hawks seem to be more prone to nest desertion than others (hawks) during the early stages of nesting." A result would be a decrease in overall production.

A total of eight known traditional nesting sites would be lost due to development, and another 24 known traditional nesting sites would be in very close vicinity to proposed agricultural development. Loss of these nests within the ES area would cause a decrease in overall ferruginous hawk production during years when prey populations were sufficient to support these hawks in the subject area.

Loss of the shrub/grassland habitat type (47,285 acres of sagebrush/grass and 14,430 acres of salt-desert/grass under the proposed action) decreases rabbit populations and in certain instances has an indirect negative effect on ferruginous hawks which prey on rabbits. Another important prey component for these hawks in the ES area is the Townsend pocket gopher. Although this prey species is attracted to agricultural areas, it is generally protected by dense vegetation (as discussed in the non-game mammal section). This makes them insignificant as a prey source.

The overall result is a loss of prey species and hunting habitat. Therefore, there would be a decline in ferruginous hawk numbers.

Western Burrowing Owl: Impacts to the burrowing owl would be both adverse and beneficial. Zarn (1974) attributes the declines in Western burrowing owl population to "loss of burrow sites as a result of widespread burrowing mammal control activities, and direct loss of habitat to

urban, industrial, and agricultural development." Although burrowing mammal control activities are detrimental, habitat loss is most critical. Burrow availability operates as the major factor in controlling burrowing owl numbers (Zarn, 1974), and for this reason land conversion in areas where burrowing owls are known to occur would have an adverse affect. Five of the nine known burrowing owl areas would be destroyed by the proposed action farm development. Rodent control through poisoning, in addition to decreasing preferred burrowing owl habitat, could also result in secondary poisoning of owls. Although burrowing owls accept a relatively high level of human disturbance, they present an ideal target, and the amount of deliberate shooting would probably increase.

The beneficial impact to these owls would be an augmented insect food supply from cropland. However, adverse impacts to the burrowing owl would far outweigh beneficial impacts.

Long-billed Curlew: Curlews inhabiting the ES area would be adversely affected. A complete loss of nesting habitat due to land conversion would result in loss of all three curlew use areas known to occur within the ES area (see Map 2-6 with Overlay 1A and 1B). An estimated 10 to 15 breeding pairs would be lost should the proposed action be implemented.

Where the curlews are not totally eliminated by loss of nesting habitat, adverse impacts would result from increased human activity. During incubation and in the early stages of chick development, the curlews need seclusion. Without seclusion, the parent birds would spend a great deal of their time off their nests in defensive displays. As a result eggs would over-cool or over-heat causing reduced overall production. The adult would spend an inflated amount of energy on nest defense, and overall production would be reduced. Another impact arising from increased human activity in areas occupied by curlews could be an increase in deliberate shooting of these birds. In nest defense, curlews "mob" or "swarm" intruders and present easy and tempting targets to some people.

The overall result of these impacts to curlews would be much reduced populations or perhaps total nonuse of this area by curlews.

Western Ground Snake: Impacts to the western ground snake would be adverse where its range overlaps with proposed agricultural development areas. Discussion of these impacts is the same as that of other reptiles and can be found under the Reptiles and Amphibians section.

Insects: Mosquito populations will increase slightly because puddles, damp vegetation, and detention structures will provide breeding habitat. They will become a nuisance in a few areas. The chance of vector-borne diseases being transmitted to humans will increase, but should not become a problem since such diseases are rare.

Endangered Species:

Bald Eagle: Formal consultation under Section 7 of the Endangered Species Act of 1973 with the U.S. Fish and Wildlife Service was initiated

on March 17, 1978. Of concern was the effect the proposed action would have on wintering bald eagles (an endangered species). After available information was analyzed and field examination completed, the U.S. Fish and Wildlife Service reached the opinion that the proposed action would not jeopardize the bald eagle. This was stated in a memorandum to BLM dated September 1, 1978.

Red-band Trout: Currently a genetic research study is being conducted on red-band trout to determine the extent of isolation of populations from drainage to drainage and the extent of separation from rainbow trout (Pacific Fisheries Research, Seattle, and Dr. Graham Gall and Eric Loudenslager). As more inventory work is completed in southwest Idaho, eastern Oregon, and northern Nevada, the distribution of this species appears to be a lot more extensive and the trout more common than reported by Simpson and Wallace (1978). To date, it does not appear that red-band trout use the Snake River to any extent but migration routes and more specifics of these populations in tributaries of the Snake River will probably be investigated in the future.

Red-band trout have been collected from the following tributaries of the Snake River from west to east: Jump Creek, Reynold's Creek, Sinker Creek, Castle Creek, and Shoofly Creek. However, with the exception of Sinker Creek, populations have not been found within the lower portions of these tributaries which are within the ES boundaries. If use of the lower portions of these tributaries by red-band trout occur it appears to be for short periods of time or infrequently. Also, virutally all of the land bordering the lower portion of these tributaries in the ES area is surrounded by private ownership and much of the stream flow is allocated for off-site use for agricultural purposes. Farm expansion on public land discussed in this ES, will not affect the red-banded trout.

Impacts Unique to the Proposed Transfer Methods

The two transfer methods being considered in the proposed action all have similar adverse impacts as previously discussed in this chapter. However, beneficial impacts may differ between these transfer methods.

As was pointed out in the proposed action and also in this chapter, wildlife habitat areas (totaling approximately 18,000 acres) would be retained within any agricultural development area. These leave areas would provide food and cover for those wildlife species that are attracted to agricultural areas. This would lead to an increase of pheasant, Hungarian partridge, and certain nongame species (as seen in Appendix 2-7, life forms 6 and 17) which would be a beneficial impact resulting from the proposed action.

The quality of the habitat on the isolated tracts would regulate the number of the wildlife that are increased by the proposed action. The transfer method used could significantly affect the quality of the habitat on the isolated tracts for the reasons described below.

Carey Act

The Idaho State Carey Act Regulations allows monetary payment for wildlife mitigation as a part of the granting of the application. This payment is designed to be shared with livestock grazing mitigation and may be as high as \$5.00 per acre. This money could help in fencing, vegetation, and water development projects on the isolated tracts. This would reduce the Federal Government's expenses regarding habitat improvement and protection.

The Carey Act requires that a residence be constructed on the farmed area. This could enhance habitat values in that most farms that have residences also plant vegetation other than agricultural crops. These windbreaks and ornamental plantings provide habitat for wildlife.

Desert Land Act

No monetary compensation or land use covenants are authorized under the Desert Land Act. Any habitat improvement or protection would be the total responsibility of the federal government.

Impact Summary

Implementation of the proposed action would result in the removal of up to approximately 130,015 acres of existing vegetation for agricultural development and public purpose tracts. Specifically, 61,715 acres of the shrub/grassland habitat type would be lost, and 49,210 acres of the grassland habitat type would be lost. An additional amount of native vegetation, up to 19,000 acres, could be removed on the public purpose tracts not utilized for wildlife leave areas. Hunting, nesting, and cover areas used by wildlife in the ES area would be substantially reduced. This loss represents significant habitat alteration resulting in decreased numbers of native wildlife now occupying this area. Conversely, those wildlife species adapted to agricultural land would show population increases due to new production of this type of habitat.

On the mule deer winter range depicted on Map 2-6, 40 to 60 deer, or 8 to 12 percent, of the deer population using this winter range within the ES area would be displaced, and the population would subsequently be reduced. Other wildlife species which would show significant population declines in the ES area due to increased agriculture include pygmy rabbits; many small non-game mammals (which serve as an important prey source); sage grouse; most raptor species including the ferruginous hawk and the Western burrowing owl; native non-game birds including the long-billed curlew; and most reptiles and amphibians.

Sage grouse would lose one strutting ground out of eight which are associated with the EIS area due to land clearance and approximately 1,000 acres of nesting and wintering habitat. This would result in a loss of 20 to 50 birds. Agricultural development in the vicinity of three additional strutting grounds would disturb sage grouse using these areas.

All known ferruginous hawk nests would be impacted by the proposed action. This sensitive species would lose eight traditional nesting sites due to agricultural land clearance. In addition, 24 traditional nest sites would be in close vicinity to agricultural development and areas of increased human activity. This would have a negative affect on birds using this area and would act to reduce numbers of this hawk using the ES area. Another sensitive species, the western burrowing owl, would likewise lose five of nine known active nesting burrows (due to land clearance) resulting in reduced numbers of this bird in the ES area.

Agricultural development in areas occupied by nesting long-billed curlews, also a sensitive species, would cause a loss of 10 to 15 breeding pairs and would significantly reduce the population within the ES area. In addition, increased human disturbance due to agricultural development near curlew nesting areas would disturb breeding birds and cause a reduction in reproductive success.

Wildlife significantly benefitting from increased agricultural development as dictated by the proposed action would include Hungarian partridges, ring-necked pheasants, house sparrows, starlings, and black-birds. BLM would reserve about 18,000 acres of public land tracts among farm projects to be managed for pheasant habitat. With proper vegetation cover, these tracts would be expected to increase pheasant numbers significantly. Waterfowl would benefit by planting of an estimated 36,614 acres of cereal crops should the proposed action be implemented. For this reason, numbers of migrating waterfowl using the ES area could increase.

Fisheries

Qualification terms are used in this section of Chapter 3 to mean the following: very slightly - between 0 percent and 1 percent; slightly - 1 percent to 5 percent; moderately - between 5 percent and 25 percent; heavily - between 25 percent and 100 percent.

Based on minimum flow requirements for three key fish species in the ES area (white sturgeon, smallmouth bass, and channel catfish), rearing flows for fish food production, and waterfowl nesting needs, Cochnauer (Idaho Fish and Game, 1976 and 1977) recommended maintenance flows ranging from 4200 CFS to 5500 CFS within the ES area. In 1978, the Idaho Legislature established an average minimum stream maintenance flow of 3300 CFS at the Murphy gage. This is considerably less than the 5500 CFS desired by the Idaho Fish and Game (IFG).

In average-flow years, the projected development would not reduce flows below the IFG recommendations for stream resource maintenance (see Table 3-2). In low-flow years such as 1977, mean flows in July and August would be below the recommended flow of 5500 CFS. Low one-day flows would be below the IFG recommended flows for the entire period from late May through September (see Table 3-3).

The proposed project would reduce wetted perimeter available to aquatic life from Swan Falls to Bernard's Ferry by 26 percent in June, the worst condition in low-flow years (see Figure 3-1). The reduction in other areas would be less due to the different stream profile there.

White Sturgeon (Average Flow Years)

There would be no effect on sturgeon reproduction (spawning and incubation) since spawning takes place in portions of the cross-sectional profile not affected by the May flow reduction caused by the proposed action. The flow would remain above IFG recommended flows for spawning.

Flow reductions caused by the proposed action would not affect sturgeon movements. The projected flow regime would not fall below levels suited for fish passage.

There would be a slight decline in growth rates of adult sturgeon. Losses of wetted river perimeter caused by flow reductions would reduce habitat slightly for molluscs and crayfish, the most important foods of sturgeon. Losses of wetted perimeter would be only partly offset by increases in benthic invertebrates resulting from project related water quality changes (see Water Quality section). There would be a slight decrease in growth rate of larval and juvenile sturgeon between Hammett and Strike Pool.

There would be a slight increase in the mortality rate of eggs and larval sturgeon hence reduced abundance of young sturgeon above Strike Pool due to increased predation and entrainment in pump intakes. There would be no change in the mortality rate of adult sturgeon and no detectable change in the mortality rate of all sturgeon below Strike Dam. Reduced abundance of young sturgeon above Strike would eventually cause slight declines in abundance of adult sturgeon.

Because of the different shape of the stream cross-section in the reach below Swan Falls, the effects of the project on sturgeon growth are more serious there than in other reaches of the river. The decline in sturgeon growth in that area should be moderate in large sturgeon. Growth of small sturgeon would be reduced slightly there.

White Sturgeon (Low Flow Years)

There would be no effect on sturgeon reproduction. There would be a slight decrease in sturgeon movements as flows drop below IFG recommended levels.

There would be a slight decline in the growth rate of larger sturgeon as shallow night-forage areas are denied them during the growing season and molluscs, a large percentage of the sturgeon food base, are exposed to drying. There would be a slight to moderate decline in growth of larval sturgeon as invertebrate-producing areas are dewatered. In the reach from Swan Falls to Bernard's Ferry, the growth of all age classes of sturgeon would be reduced moderately because stream cross-section profile differs there. From Hammett to C.J. Strike, slight accumulation of bed load deposits in low-flow years should very slightly improve habitat for mollusc used by sturgeon, partly offsetting losses in invertebrate availability as wetted area decreases.

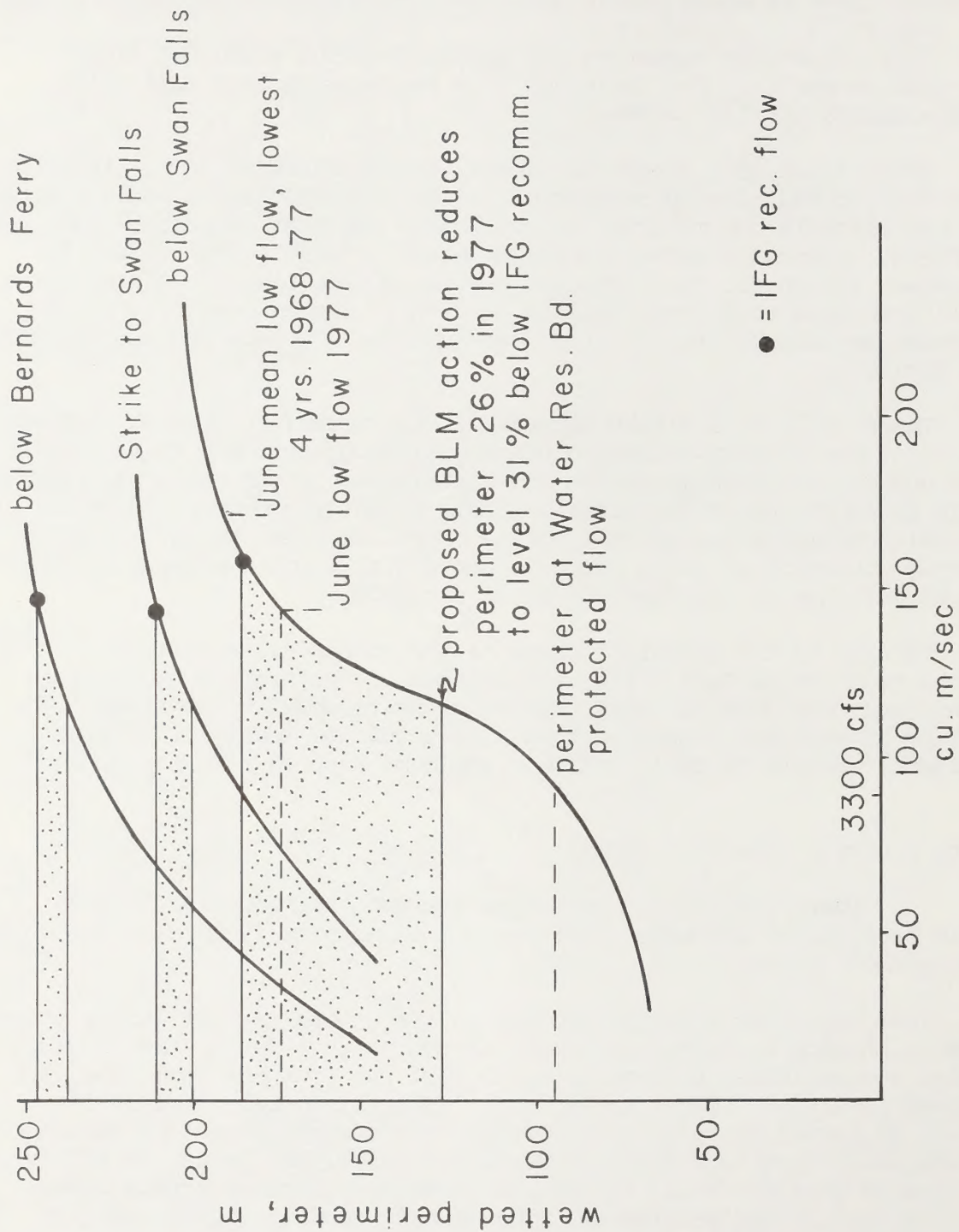


FIGURE 3-5. Wetted perimeter.

There would be a slight increase in mortality of embryos and small sturgeon as all fish species become concentrated by reduced flows (a condition more ideal for predators) and as pump intakes entrain more larvae above Strike Pool.

Other Fish Species (Average Flow Years)

A slight decrease in water depth, an improvement in water clarity, and an increase in plant and insect populations would slightly increase food available per unit area for most fish species above Strike Pool. It would also slightly improve hunting success of predaceous fish.

The flow regime would not affect fish migrations upstream or downstream. Reservoir populations of fish would not be affected by the projected development, except that in the upper portion of the Snake River arm of Strike Pool, channel catfish and smallmouth bass would enjoy slightly improved habitat quality.

Reduced wetted perimeter in reduced summer streamflows would slightly increase mortality in embryos and larvae of channel catfish, smallmouth bass, and black crappie. Channel-spawning species such as squawfish, whitefish, and suckers would not be affected.

Other Fish Species (Low Flow Years)

Reduced summer flows would slightly increase mortality in embryos and larvae of edge-spawners such as channel catfish, smallmouth bass, and black crappie as spawning and early-rearing areas are dewatered in June and July. Channel-spawning species would be slightly affected. Temperature triggered mortalities of whitefish would be slightly more likely in low-flow years.

Fish growth would be reduced slightly as the fish populations are concentrated by project-caused reduced flows in a reduced wetted perimeter. Food-producing areas would be lost and slightly more pressure placed on remaining food resources. Predator harvest of prey would increase slightly as prey populations are concentrated in the reduced stream area. Interactions for spawning sites would become slightly more severe as populations are concentrated by reduced flows. Interactions for available cover would become slightly more severe as fishes are confined to the reduced wetted stream area in the growing season. Slightly to moderately more fish would be entrained in pump intakes and lost in water-delivery systems. Lower flows caused by the proposed action would have no effect on migrations or movements up and downstream. Reservoir populations would not be affected except that channel catfish and smallmouth bass would have improved habitat quality.

Further Comments on Low-Flow Years

Smallmouth bass are the most prized warm water game fish in terms of total angler interest. Smallmouth bass would be most affected by

projected water withdrawals. As noted in the discussion of minimum and recommended streamflows, a wetted-perimeter reduction for the area below Swan Falls would reach 26 percent in June in a low-flow year such as 1977 but only about 5 percent in usual low-water periods. Reductions in other reaches of the river would be less, as indicated earlier. But the reach below Swan Falls is heavily used by anglers and has been termed "the best warm water fishery in the ES area" (H. Pollard, personal communication). The lost wetted perimeter at low-water (26 percent) and less wetted cross-section would impact spawning in June and July. A reduction in water level at any time between mid-June and mid-July would strand smallmouth bass eggs, larvae, and fry. The net effect would be a moderate reduction in smallmouth numbers.

Black crappie also spawn in marginal areas in spring and would be expected to suffer reduced abundance in the quieter stream segments used by this species. Channel catfish, an important species in the reach below Swan Falls, would also decline slightly in abundance due to de-watering.

The best available estimate of food availability for young game fish is a function of the quantity of wetted perimeter of stream. The rapid decreases in wetted perimeter as flows decline below 5500 CFS in the Swan Falls-Bernard Ferry reach indicate that the populations of invertebrates would suffer from loss of living space, especially in low-flow years, and would be less abundant in total.

Since three of the major game fish species (smallmouth bass, channel catfish, and black crappie) spawn in shallow water at the time when substantial quantities of water are being withdrawn for irrigation, the area available for nest placement would be reduced as wetted perimeter drops. It is possible that bass and crappie would be able to find alternative sites, but channel catfish have specialized requirements for spawning sites (undercut banks, crevices, bank vegetation) and would be denied these areas as the water level drops.

As water flow declines, riparian vegetation becomes inaccessible to game fishes. The ecological balance would tend to shift toward non-game species as cover for game fish becomes less available over successive summers.

Feeding behavior of whitefish and suckers makes these species the most likely consumers (along with sturgeon themselves) of incubating sturgeon embryos which adhere to rocks in and below spawning areas. Flow reductions in June, during and just after sturgeon spawn, concentrate these fishes in parts of the channel profile in which sturgeon eggs lie. Sturgeon embryo survival would decline.

Reductions in smallmouth bass numbers as a result of several years of flow reductions at bass spawning time would reduce predator pressure on larval suckers, whitefish, and the larvae of the various members of the minnow family. The extent of this change is unknown and unpredictable.

Flow reductions in late spring and summer would have their greatest impact on those species which use stream edges for spawning and incubation. Suckers, squawfish, whitefish, trout, dace, and shiners spawn in channel areas less subject to edge loss. Of these species, squawfish, whitefish, and shiners all leave their eggs exposed and are subject to predation. Dewatering would impact embryos of trout, dace, and suckers (all of which bury their eggs) less than the other channel spawners.

Impingement and Entrainment

Mortality rates of fish eggs and larvae entrained in pump intake structures at conventional power plants are normally 40 to 100 percent with most plants resulting in the mortality of all eggs and larvae entrained (Marcy 1975). Most of the sources of mortality from entrainment could equally affect fishes entrained in the high-lift pumps that would be used in the proposed action in the Snake River. In addition, fishes that survive pumping but are stressed may subsequently become more vulnerable to predators.

Fish mortality at intake structures is typically most severe when water temperatures are below about 10°C when fish are sluggish. Since water withdrawals for the proposed project would commence in mid-April when temperatures would be about 15°C, temperature effect would not be significant.

Those fish species whose juveniles tend to school and/or inhabit shorelines near where pumping stations would presumably be located would be most vulnerable to pumping mortality. Channel catfish, black crappie, and bluegill (in that order) would be the species most vulnerable as reported elsewhere in the country (Mathur et al 1977, Freeman and Sharma 1977). Impacts are likely to be slight to moderate for those species. Other gamefish species, with the possible exception of white sturgeon, would not be impacted by entrainment or impingement. Too little is presently known of the distribution and behavior of juvenile sturgeon to predict how they may be affected.

Accidental Mortalities

Occasional and unpredictable overland flows of water from broken lines or from intense summer storms would carry pesticides, other toxicants, and fertilizer residues to the Snake River. Fish kills in localized areas would occur from time to time, but their magnitude cannot be estimated.

Fisheries Impacts Downriver from the ES area

Flow reductions below Hells Canyon on the Snake River would reduce the total water available for passage of downstream migrant smolt salmon and steelhead in the lower Snake and Columbia Rivers. Given present

flow management regimes for flood control and power production, spill is reduced at dams in the system. In low and average-flow years, most juveniles must pass through turbines unless special spill arrangements are made. Since 1977, each year, river operating agencies have been ordered by the Federal Regulatory Commission (FERC) to provide 10 percent of the daily average flow as spill for up to 30 days during the downstream juvenile migration season. Even with these spill arrangements, many juveniles will pass through the turbines, suffering resultant mortality. The contribution of the proposed action to flow decline below Hells Canyon is very small as judged by flows at Anatone in the lower Snake.

A flow reduction in the lower Snake and Columbia Rivers would slightly increase water temperatures, subsequently impacting migrations of adult salmon and steelhead and slightly increasing disease potential. This flow reduction and temperature increase would contribute very slightly to the stresses suffered by migrating fish, both juvenile and adult. Any stress increment tends to make fish more susceptible to agents of mortality.

Flow reductions below Hells Canyon would have no discernible effect on resident species. Flows in the area already fluctuate drastically in a 24-hour period because Idaho Power Company operates turbines in response to peak demands. The wetted margin of the river often drops 5 feet vertically within a few hours, then increases again 12 to 24 hours later. These fluctuations are softened below the mouth of the Salmon River, yet persist to Lower Granite Pool near Lewiston.

As a further note, it should be stated that the only anadromous salmonid species spawning in the Snake River downstream from Hells Canyon Dam is a remnant run of fall chinook (about 1000 to 2000 fish passed Lower Granite Dam in recent years). During the incubation season (November-March), flows would be unchanged in November and very slightly increased in the period December-March (maximum increase would be 0.1 percent) as a result of prolonged return of irrigation flows as ground-water. There is little or no rearing by anadromous salmonids in the Snake River from Hells Canyon Dam to the mouth. Hence, the only matter of possible concern is the effect of reduced flows on migrations of juveniles and adults. There is no evidence that flow reduction in average-flow years equal to less than one percent can have a measurable influence on either juveniles or adults. In a low-flow year such as 1973, the April and May flow reductions would be 0.8 and 1.1 percent, respectively. It is difficult to anticipate any measurable effect of even these reductions on either water quality or survival of migrating salmonid juveniles. A calculated 5 percent flow reduction in September of 1973 would be unlikely to produce measurable impacts on upstream migrants (fall chinook and steelhead), especially below the mouth of the Clearwater River (which would ameliorate the effect of the 5 percent reduction at Anatone). It is remotely possible that fall chinook adults would be delayed very slightly in a low-flow year in their passage through the reach above Lewiston in September. In October of 1973, the effect of the proposed action would have been in flow decrease of 0.4 percent, which would not have affected adult migrations.

Brownlee, Oxbow, and Hells Canyon Dams on the mid-Snake all have great storage capacities, and Idaho Power Company often manipulates these to hold spring storage water longer into the summer, minimizing flow changes from the present regime in downstream reaches.

The Corps of Engineers (USACE 1976) prepared an environmental review study which examined the effects of various levels of irrigation development on resident fish and water quality in the lower Snake River and Columbia River. Assuming a projected level of irrigation based on year 2020 estimates by federal and state sources, the Corps study indicates rather severe impacts on resident fish, water quality, and recreation under certain probable conditions of flow-impacts to which the proposed action would contribute slightly.

Impacts Unique to the Proposed Transfer Methods

Due to the differences that the methods of land disposal (Carey Act versus Desert Land Act) impose on water quality impacts (as discussed in the Water Quality section of Chapter 3), the Carey Act method of disposal would have slightly less impact on fisheries than the Desert Land Act method of land disposal.

Impact Summary

Significant adverse impacts upon fisheries would occur during low-flow years. During these low-water years mortality of larvae and embryos of edge spawners (channel catfish, smallmouth bass, and black crappie) would increase sharply. Reduced survival of edge spawners would eventually lead to a slight shift of the fish species mix toward channel spawners, and fish biomass in the ES area would move toward squawfish, suckers, shiners, and in a few locations toward trout. Overall losses in harvestable portions of game-fish stocks would amount to 5-25 percent as a result of the proposed action. Sturgeon would decrease slightly to moderately as growth and larval survival decrease due to loss of wetted stream area. Edge-spawning species (smallmouth bass, channel catfish, black crappie) would decrease slightly to moderately because of effects of reduced wetted stream area on reproduction, growth and survival.

Also of major significance would be the moderate decline in growth and moderate increases in mortality of the white sturgeon along with other game fish in a low-flow year due to predation. These would lead eventually to moderate declines in sturgeon abundance. These declines will take some time because sturgeon stocks consist of 50-70 year old age classes.

With the exception of sturgeon, most game fish stocks in the ES area have 5 to 6 year classes in the population (although a few older fish will always be present). Thus, if two low-flow years were to occur within 5 years, one-third of an edge-spawning population would be impacted by reductions in reproductive success and growth. Sturgeon stocks consist of many age classes, hence the impact of two low-flow years in a short period does not immediately alter the total biomass. Eventually,

reduced growth and survival of sturgeon will lead to moderate declines in abundance.

The monthly low flows (low one-day flows) at Murphy from 1914 through 1974 were examined to determine the reduction in flow below the 5500 CFS level (Idaho Fish and Game Department recommended stream-maintenance flow at Murphy). The table below indicates the frequency with which flows would have dropped below 5500 CFS in the period, based on USGS gaging records:

	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>
Years below 5500 CFS	0	8	16	3
Years examined	59	60	59	58
Percentage	0	13	27	5

The worst effect is in July (27 percent). Effects would be considerably less in May-June and August.

Average-flow years would only slightly impact fisheries in the ES area. Slight increases in mortality of larval white sturgeon, channel catfish, smallmouth bass, and black crappie in the Snake River ES area would occur. Growth of these same species would decline slightly. Total abundance would decline slightly to moderately.

The mean flow reduction caused by the proposed action, as determined above the mouth of the Clearwater River, would be 0.45 percent for April and 0.74 percent for May. Flows would be unchanged in the November-March incubation season for fall chinooks. Since there is little or no rearing by anadromous salmonids in the Snake River below Hells Canyon, the only matter of concern is the effect of reduced flows on migrations of juveniles and adults. In a low flow year such as 1973, the April and May flow reductions would be 0.8 and 1.1 percent, respectively. There would be no measurable effect of these reductions on either water quality or survival of migrating salmonid juveniles. A calculated 5 percent flow reduction in September of 1973 would be unlikely to produce measurable impacts on upstream migrants (fall chinook and steelhead), especially below the mouth of the Clearwater River (which would ameliorate effects of the 5 percent reduction at Anatone). Of themselves, the flow reductions caused by the project in average years in the lower Snake River would not pose a measurable threat to anadromous fish resources or to water quality. The cumulative reductions in flow caused by this and other possible withdrawals do pose serious threats to anadromous salmonids. The ES does not anticipate the collective impacts of the proposed action together with other possible but unconfirmed withdrawals.

Even with settling ponds, occasional overland flows of water will occur from very intense summer storms or broken canals or pipes. These flows will occasionally carry toxic materials to the river, and localized fish kills of unpredictable severity will occur. Winds will also carry toxic materials (bound to soil particles) to the river with the same effects.

If the proposed action is taken, it could contribute to the demand for more electrical energy, helping to justify construction of additional hydropower or thermal generation stations, both of which could eliminate habitat for sturgeon and other game fishes in the Snake River ES area. Hydropower stations physically eliminate running-water habitat. Their use for stable levels of energy production leads to increased use of hydropower dams for peaking, leading to substantial water fluctuations with accompanying deterioration of fishery habitat.

Unknown quantities of Snake River fishes will be entrained in pump intakes and lost to the system. These may include preferred game fishes. Screening of pump intakes is not practical because of plant debris which will continually clog intakes.

In conclusion, the impacts of the proposed action on fisheries would be three-fold: there would be a reduction in game fish numbers, an increase in trash fish numbers, and a reduction in white sturgeon. The proposed action, of itself, would have no discernable impact on downstream anadromous fisheries.

WILD HORSES

Owyhee Herd

Public land within the Owyhee wild horse range that would be subject to agricultural development under the proposed action amounts to approximately 2,800 acres (two percent) of the total 156,600 acres used by the herd (see Map 2-7 and Overlays 1A and 1B). These 2,800 acres generally receive limited wild horse use in comparison with the remaining herd range due to poor forage condition, lack of water, and close proximity to roads and human activity. This 2,800 acre reduction in range is not expected to adversely affect herd size or restrict customary movements or habits of the horses.

New access roads associated with farm development may make the wild horses slightly more accessible to the public, thereby increasing the chances for harassment of the herd.

Saylor Creek Herd

As mentioned in Chapters 1 and 2, the Saylor Creek wild horse herd will not be managed under a Wild Horse Management Plan (WHMP) until 1983. Until that time, decisions would have to be postponed as to whether or not to allow farm development on approximately 31,900 acres of the proposed action that is within the estimated present 103,200 acre herd range (see Map 2-7 and Overlays 1A and 1B). The WHMP will determine optimum herd size, designate specific herd range, and provide management practices to adequately protect, maintain, and manage the herd under the multiple use concept.

Until the Saylor Creek WHMP is completed, it is not possible to predict impacts of agricultural development on the herd. As BLM is

obligated by law (Wild Horse and Burro Act) to insure protection and management of wild horses on public land, agricultural development could be precluded in areas devoted to herd management.

CULTURAL RESOURCES

In less than ideal situations, some cultural sites would be adversely impacted in spite of the mitigation contained in the proposed action. These less than ideal situations would include the following:

- (1) Failure of the field archaeologist to detect the presence of a cultural site or some of its components, leading to gross under-estimation of the site's significance.
- (2) Inadequate test excavation or salvage due to limited time and money, thus sacrificing some of the data contained in the site.
- (3) Sanctioned site destruction following failure of the Secretary of Interior to confer National Register eligibility on a given site.
- (4) Increased vandalism to cultural sites as a result of more people in the area and improved access, both established effects of the proposed action.

All types of sites found in the ES area would be vulnerable to adverse impacts in the situations described above. It cannot be determined how many of the known 61 sites and the yet undiscovered sites in the area of the proposed action would actually be adversely impacted.

The primary adverse impact on cultural resources must be described in terms of the resource as a whole. An undetermined portion of a non-renewable finite resource base would be lost forever as a result of the proposed action, regardless of the situation fostering destruction. Salvage excavation itself is an adverse impact on those sites which must be salvaged.

Implementation of the procedures required by law as outlined in the Statutes Restricting Farm Development section of Chapter 1 would substantially prevent adverse impacts to individual cultural sites. These procedures require BLM to conduct cultural and paleontological resource inventories prior to allowing farm development and to consult with the State Historic Preservation Office, the Heritage Conservation and Recreation Service, and the National Advisory Council on Historic Preservation regarding National Register eligible properties.

The basic beneficial aspect of the proposed action would be the accumulation of cultural data through survey and excavation necessitated by agricultural development, thus contributing to the knowledge of pre-history and history in the ES area.

VISUAL RESOURCES

The visual setting of the ES area is characterized by extensive open

spaces of sage covered rolling hills dissected by the Snake River and smaller drainages. The visual resources are an integral part of the recreational opportunities enjoyed in the area.

All activities associated with farming modify the natural landscape. Vegetation conversion, new roads, transmission lines, buildings, pump stations, pipelines, canals, etc., all alter the visual resource. Impacts would occur both on-site from the conversion of rangeland to farming and off-site from various developments associated with farm development.

The Visual Resource Management (VRM) classes discussed in Chapter 2 and the Bureau of Land Management's Visual Resource Contrast Rating Manual 8423 were used to provide a basis for measuring impacts of the proposed action on the visual resources.

The most significant impacts of the proposed action occur on four areas: Oregon Trail and Kelton Road corridors, Hagerman Fossil Beds, Snake River corridor, and Morrow Reservoir (see Map 2-10). These are areas where the visual contrast of farming under the proposed action would exceed VRM objectives.

Oregon Trail and Kelton Road Corridor

This area, including a corridor averaging 1 mile in width along the Oregon National Historic Trail and remnants of the Kelton Road has been designated as VRM Class I. The proposed action would eliminate 15,520 acres, or 40 percent, of this VRM Class I area. In addition, agricultural and associated developments would produce discordant visual impacts within and outside those portions of the corridors remaining after farm development. These visual impacts would be associated with farm structures, transmission lines, roads, and other developments which would be visible from or would cross remnants of the historic routes.

Secondary impacts would result from increased uncontrolled recreation use and vandalism due to additional road access and increased population associated with the farms. Such actions would adversely affect historic features and sightseeing opportunities.

Hagerman Fossil Beds

The proposed action would result in the farm development of four forty-acre parcels of land within the boundary of the designated Hagerman Fauna Sites National Natural Landmark (proposed Hagerman Fauna Sites National Monument). Any farm development within this area which has been designated as VRM Class I would produce discordant visual impacts. As a result, the potential for future inclusion of 160 acres into the National Park System would be impaired.

Snake River Corridor

The proposed action would result in the construction of an undetermined number of irrigation pump stations along the Snake River. Modifications would include removal of natural vegetation, dredging of river



VRM Class I - Oregon Trail Route

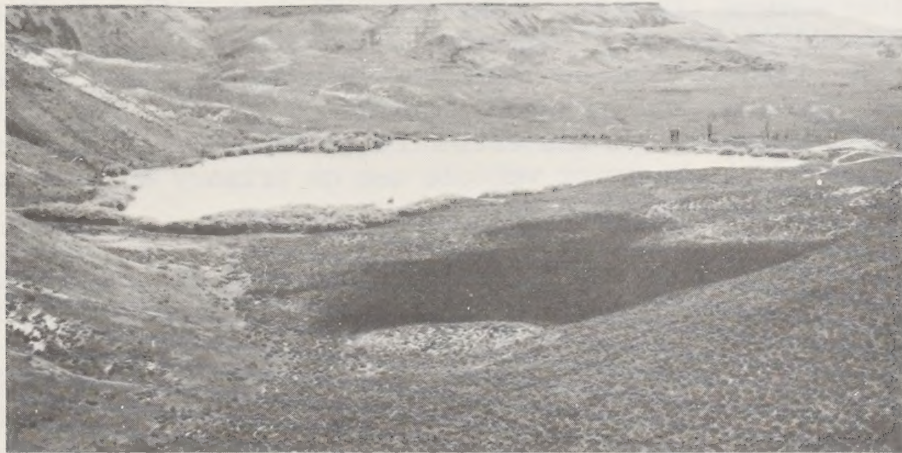


VRM Class IV - Most common landscape found in ES area.

FIGURE 3-6. Visual Resource Management (VRM) Classes.



VRM Class II - Snake River Canyon near Bliss.



VRM Class II - Morrow Reservoir.

Figure 3-7. Visual Resource Management (VRM) Classes.

shoreline, and construction of roads, pipelines, transmission lines, and pump stations. The visual resource contrast resulting from these developments would exceed the VRM objectives of this VRM Class II area at locations where pump stations were constructed.

The most descriptive visual impacts would occur where the canyon cliffs are viewed from recreation areas and by passing motorists from primary roads, i.e., Interstate 80 and Highway 30. Interstate 80, from Hammett to Bliss, was used by an average of 5,968 vehicles daily in 1977. Highway 30, from Bliss to Buhl, averaged 1,245 vehicles daily in 1977 (Idaho Transportation Department).

Morrow Reservoir

Proposed agricultural development would cover the majority of the Morrow Reservoir area which lies within a VRM Class II area (see Map 2-10 and Overlays 1A and 1B). Farm development would adversely affect scenic values and would exceed the VRM Class II objectives for the area.

Within the remainder of the ES area, farm development would occur on areas of low scenic value. Many individuals would consider it to be a pleasing scenic condition. Others would prefer to view the vast, open space sagebrush landscape in its unaltered condition.

In addition to the man-made developments discussed above, occasional dust storms caused by strong winds blowing across freshly plowed fields and smoke stubble burning would adversely effect scenic values during the spring and fall seasons.

RECREATION

Within the ES area, 91 percent of the recreation use, exclusive of sightseeing, occurs along the Snake River for activities such as fishing, waterfowl hunting, boating, swimming, waterskiing, camping, and picnicking. The rangeland above the river is used for off-road vehicle activities, hunting, and rockhounding. In 1977, excluding sightseeing from roads, recreation use was estimated at 83,000 visitor days. During the same year, daylight motor vehicle use on primary and secondary roads amounted to 335,000 visitor days.

The proposed action could result in the loss of 111,015 acres of public land for recreation uses. Recreation opportunities on remaining adjacent public land could also be impaired due to some access being blocked by private land, farm fences, and obliterated roads although new farm related roads would likely create about the same access opportunity that was lost.

The effect of the proposed agricultural development upon recreation would vary by recreational activity. The most significant impacts would be on the sightseeing, ORV use, and hunting activities.

Sightseeing

The proposed agricultural development would have substantial adverse

impacts on the viewing and enjoyment of historic features. Farm development would destroy 14 miles of remnants of the Oregon Trail within the National Trails System and 4 miles of the historic Kelton Road, which is called the north alternate of the Oregon Trail by Dr. Merle Wells (Idaho State Historic Preservation Officer). In addition, public enjoyment of segments of the historic routes remaining after farm development would be impaired by views of modern intrusions associated with the proposed action (powerlines, roads, farm buildings, fields). Furthermore, increased road access and population growth (ranging from 581 to 986 people - see Socio/Economic section) associated with farm development would encourage inappropriate motorized recreation use of the historic routes and could result in historic site vandalism. Such use would decrease the quality of the historic sightseeing experience.

Developments associated with farm development, namely pump sites, would degrade sightseeing qualities along the Snake River, especially within those areas visible from highways. (See Visual Resource Section). Sightseeing use via boat would also be degraded by pump site developments contrasting with the natural river shoreline.

For the remainder of the ES area, farm development would have either adverse or beneficial effects on sightseeing, depending on the viewers point of view. Some find agricultural landscape pleasing, while others see greater value in desert scenery.

Off-Road Vehicle Use

An estimated 60,400 acres of land within the proposed action areas are used by ORV enthusiasts. It is estimated that the affected acreage was used by 3,500 motorcyclists and 2,300 four-wheel drive enthusiasts during 1977.

Farm development would result in a displacement of this ORV use to other public land. This displacement along with farm associated road development and population increase could result in additional and more concentrated ORV use on nearby public land.

Hunting

The wildlife section discusses impacts on wildlife species found in the ES area. Mule deer, sage grouse, and pygmy rabbit populations would be reduced by proposed action farm development. These species are pursued by hunters. Other game species that are hunted by sportsmen in the ES area would not be affected. These are principally mountain cottontail, coyote, bobwhite quail and chukar partridge.

A number of hunted wildlife species would likely increase due to enhanced habitat conditions. These would be California quail, Hungarian partridge, mourning doves, pheasants and certain waterfowl species. As part of the proposed action, about 18,000 acres of isolated tracts would be interspersed throughout the 111,015 acres of new farmland. These tracts would be managed to increase upland game bird numbers; principally pheasants. The tracts would have public access for recreational hunting. It is estimated that 18,000 acres of isolated wildlife tracts would

generate 6,600 hunter days annually in the ES area (BLM Burley District 1979 survey estimates that each acre of isolated tracts equals .37 hunter days per season). This would generate \$80,520 (\$12.20 x 6,600 hunter days) expended by hunters using the isolated tracts if the value for a hunter day is used from the Chapter 2 Recreation section.

It is expected that some farmers would not allow public hunting on their land and some would. Farmland open to hunting would create an additional opportunity for sportsmen. Probably, isolated tracts would offer the better combination of habitat conditions to attract pheasants during the fall hunting period, however.

Certain species of waterfowl (see Chapter 2, Wildlife) feed on grain. Farmland open to hunting could give sportsmen a chance to field hunt for ducks and geese.

Overall, public hunting access on 111,015 acres of new farmland is impossible to estimate but there would be a net hunting gain in the ES area due to the isolated tracts program, and some farms undoubtedly would be left open for sportsmen.

Rockhounding

Ten known rock collecting areas were identified within the ES area. Under the proposed action, an estimated 9 percent of these areas would be converted to privately owned farms which are often unavailable for public use.

If these disturbed rockhounding areas remained open to public use during those seasons when the land was not being actively farmed, a beneficial impact would occur since the vegetative removal and soil disturbance associated with farming would uncover collectable rocks.

Water Based Activities

The proposed action impact on the Snake River fishery is expected to reduce harvestable game fish stocks (smallmouth bass, black crappie and channel catfish) from 5-25 percent depending on whether river flows are normal or low as in 1977 (see Fisheries section, impact summary). A reduction in the quality of fishery habitat would have a corresponding negative affect on fishing opportunities due to reduced fish numbers. It could be assumed that reduced sport fishing success caused by fewer fish would eventually diminish angling use of the Snake River.

Most camping and picnicking occurs along the Snake River and is associated with fishing, waterfowl hunting, and other water related activities. Therefore, any reduction of water related recreation opportunities during low-water years would have a corresponding effect on camping and picnicking opportunities.

Irrigation withdrawals would result in no impact on boating, water-skiing, and swimming during normal water years. However, during low-water years, adverse impacts may occur on the free-flowing sections of river due to reduced water flow. No impacts are expected on the reservoirs which accommodate the majority of these activities.

Impact Summary

Proposed action farm development would destroy 14 miles of remnants of the Oregon Trail within the National Trails System and 4 miles of the historic Kelton Road. Farm development accompanied with an increase of road and better access would likely encourage inappropriate motorized recreation of these historic routes. Pump station development on the Snake River would degrade scenic quality. Farm development would displace about 60,400 acres of land currently used for ORV activities and force other public land to be used for this type of recreation.

There should be a net hunting gain in the ES area with new upland bird habitat created from agricultural land use and the BLM's wildlife isolated tracts program. During low water years, water based recreation (fishing, camping) on the free-flowing portions of the Snake River would diminish.

WILDERNESS

The proposed action would result in no direct impact to wilderness resources.

Section 603 of FLPMA requires that all designated Wilderness Study Areas be considered unavailable for the development of farms, utility and access corridors, and other improvements which would impair their suitability for preservation as wilderness until Congress acts on the President's recommendation as to the suitability of the areas for designation as wilderness.

Implementation of the proposed action is expected to result in an increase in population of between 581 and 986 people within the ES market area (as described in Chapter 3, Socio-Economics). This increase in population could in turn result in some slight deterioration of wilderness characteristics within designated Wilderness Study Areas due to increased recreational use and increased particulate air pollution originating from farm projects and other developments. Control of such deterioration of wilderness characteristics is not considered feasible due to its random or dispersed nature.

A total of approximately 20 acres of land proposed for agricultural development is located within the Wilderness Study Areas shown on Map 2-8. Development of these acres would be deferred until completion of the wilderness review process (see Chapter 1, Statutes Restricting Farm Development Under the Proposed Action).

LIVESTOCK GRAZING

With implementation of the proposed action, 148,000 acres of farms and public purpose tracts would be interspersed throughout the 418,580 acres of public land within the ES area currently used for livestock grazing. Map 2-12 and Overlays 1A and 1B show the proposed development pattern in relation to present livestock grazing allotments.

The most apparent and significant impact associated with the proposed action would be the elimination of livestock grazing an approximately 146,380 acres of public land. Table 3-5 shows, by allotment, the 146,380 acres to be removed from grazing use and the associated 14,975 AUMs which would be lost per year as a result.

Table 3-6 further breaks down the 14,975 AUMs to indicate the approximate impact to the 127 individual livestock operators. Estimated AUMs to be lost within each allotment were proportionately distributed to all operators within the allotment (column 4). Reductions in licensed livestock grazing use similar to these preliminary estimates would be made by the BLM with implementation of the proposed action. To adjust to these reductions, each operator would have to either reduce operations accordingly, go out of business, or try to find another grazing location.

Customary trailing routes (other than reserved stock driveways shown on Map 2-12) would also be lost under the proposed action. Operators would have to truck their animals or take longer, less direct trailing routes. More operators may attempt to use the reserved stock driveways, however, these driveways are only 1/4 mile wide in some places and may not withstand much additional use.

Existing range improvements associated with livestock grazing within the ES area would no longer be effective. The proposed action would result in the loss of the use of as much as 87,085 acres of range grass seedings, 140 miles of fence line, 18 miles of water pipeline, 9 cattleguards, 9 check dams, 8 water troughs, and 4 developed springs or wells owned by the BLM, plus other privately owned improvements. Compensation would have to be made by farm developers to the respective rancher or to the BLM for fair market value of authorized range improvements that would be removed (43 CFR 4120.66c).

The scattered land pattern of the proposed agricultural development would also pose problems. It would be difficult for operators to locate and keep track of their animals on the public land amongst the farms. Access would be limited in some areas, making it necessary for operators to take longer, less direct routes to reach public land within or on the other side of the ES area. Refer to Map 2-12 and Overlays 1A and 1B.

Some problems for the livestock operator may arise due to farm projects being located within and adjacent to grazing areas. Such problems that have occasionally occurred in the past around existing farms and could inadvertently occur with the proposed development include

TABLE 3-5

ACRES AND AUMs INCLUDED IN PROPOSED ACTION, BY ALLOTMENT

Allotment	Public Land Included In Proposed Action		Public Land Within ES Area	
	(Acres)	(AUMs)	(Acres)	(AUMs)
Graveyard Point	0	0	1,165	40
Poison Creek	0	0	450	25
French John Area	0	0	315	15
Elephant Butte	1,220	13	3,870	99
River Group	420	30	1,785	131
Reynolds Creek Group	2,430	109	4,255	239
Black Mountain Field	1,120	79	3,800	223
Oreana #1	250	7	425	123
Nahas Individual	420	12	1,460	44
Oreana #2	970	54	5,155	256
Fossil Butte	3,520	98	18,420	469
Oreana #3	1,760	19	4,650	52
Castle Creek, Winter	4,800	240	23,330	1,188
Battle Creek, Winter	1,240	13	11,280	120
Battle Creek, SpSuF	600	30	6,245	312
Tindall Northwest	3,920	249	24,220	1,426
Chalk Flat	140	9	445	29
Sunnyside, SpF	460	32	755	53
Hammett #1	600	150	9,645	2,176
Hammett #2	2,200	302	2,800	400
Hammett #3	320	27	640	67
Hammett #4	11,910	1,454	42,670	5,782
Hammett #5	80	9	900	101
Saylor Creek	108,240	12,039	249,900	28,027
TOTALS	146,380 <u>1/</u>	14,975	418,580	41,397

1/ Approximately 1620 acres of the total 148,000 acres of public land subject to development are not presently grazed.

SOURCE: BLM Boise District grazing case files and 1940, 1959, 1962, 1965 range vegetation surveys.

livestock trespassing onto farmland where fencing is inadequate or gates are left open; livestock becoming entangled in or injured by agricultural debris; and livestock ingesting toxic chemicals as the result of careless application and use of farm pesticides or fertilizers.

Overall, the total impacts resulting from the reduction in grazing use, scattered farm locations, and inadvertent interference of livestock operations from adjacent farm activity may be severe enough that for many operators it may no longer be physically nor economically feasible to graze livestock on the public land remaining amidst the farms. Because of this possibility effective grazing use may no longer be possible on all the public land left within the ES area after proposed action farm development. Therefore, in the worst case situation, up to a maximum of 41,397 AUMs on 418,580 acres could actually be lost to grazing among 127 operators rather than 14,975 AUMs on 146,380 acres.

Tables 3-5 and 3-6 show acres and/or AUMs of grazing use within the ES area for comparison with those strictly subject to development indicating the minimum and maximum losses possible under the proposed action. Column 6 shows the total number of AUMs for which each operator is licensed within the BLM Boise District. This gives an indication of sizes of total local operations. Column 7 of Table 3-6 shows approximate percentages of these local operations that would be lost strictly through loss of 146,380 acres of grazing land under the proposed action.

As a result of the proposed action, the figures in Column 7 of Table 3-6 show that at a minimum, out of 127 livestock operators, approximately 42 would lose more than 20 percent of their operation in the BLM Boise District; approximately 13 would lose 11-20 percent; and approximately 72 would lose 0-10 percent.

Impact Summary

With implementation of the proposed action, livestock grazing would be eliminated on approximately 146,380 acres of public land within the ES area. An estimated 127 individual livestock operators in 24 allotments would lose a total of approximately 14,975 AUMs of associated grazing use per year. In addition, the use of a number of range improvements, including 87,085 acres of range grass seedings, 140 miles of fenceline, 18 miles of water pipeline, 9 cattleguards, 9 check dams, 8 water troughs, and 4 developed springs or wells owned by the BLM, plus other privately owned range improvements would also be lost.

Total cumulative impacts from reduced grazing use, scattered farm locations, and inadvertent interference of livestock operations from adjacent farm activity may be severe enough that for many operators it may no longer be feasible to graze livestock on the public land remaining amongst the farms. In some allotments, effective grazing use may no longer be made within the ES area. Therefore, up to a maximum of 41,397 AUMs per year could in effect be lost, rather than 14,975 AUMs.

TABLE 3-6

AUMS INCLUDED IN THE PROPOSED ACTION AND WITHIN THE ES AREA, BY OPERATOR

(1) Operator	(2) Allotment	(3) Active Grazing Quali- fications (AUMs)	(4) AUMs Included Proposed Action	(5) AUMs Within ES Area	(6) Total AUMs in Boise District	(7) Percent of Local Operation Included in Proposed Action (AUMs) (Col.4÷Col.6)
R. Adolf	Saylor Cr.	750	173	394	750	23
Arkoosh & Zidan	Saylor Cr.	2,070	467	1,087	2,070	23
E. Ascuna	Saylor Cr.	609	137	320	609	23
E. Astorquia, Est.	Saylor Cr.	3,108	700	1,630	3,108	23
J. Barinaga & Sons	Saylor Cr.	200	45	105	2,145	2
H. Bass	Reynolds Cr. Group	565	14	31	565	3
J. Bass	Reynolds Cr. Group	493	13	26	511	3
P. Batruel	Hammett #4	62	14	58	62	22
C. Berry	Saylor Cr.	2,100	473	1,102	2,100	23
A. Black	Saylor Cr.	630	142	331	2,214	6
J. Black	Battle Cr. SpSuF	1,372	3	34	2,935	8
	Saylor Cr.	1,059	239	556		
P. Black	Castle Cr. W	68	4	12	850	1
	Battle Cr. SpSuF	782	2	19		
T. Blackstock	Elephant Butte	177	9	65	1,384	1
S.D. Blackwell	Hammett #1	95	3	44	95	3
S.S. Blackwell	Hammett #4	470	87	347	511	20
W. Boston	Reynolds Cr. Group	104	3	5	104	3
R. Brailsford	Saylor Cr.	283	64	149	283	23
H. Brandau	River Group	440	8	34	482	2
	Black Mtn. Field	42	1	2		
R. Brandau	River Group	241	4	18	271	2
	Black Mtn. Field	30	1	1		
W. Brimson	Hammett #4	195	43	172	195	22
R. Bruce	Poison Cr.	172	0	10	719	0
Bruneau Cattle Co.	Battle Cr. SpSuF	5,649	13	134	6,819	1
Burghardt Co.	Castle Cr. W	275	15	71	3,446	1
	Battle Cr. W	276	13	120		
C. Carnahan	Saylor Cr.	983	222	516	983	23
I. Carnahan	Saylor Cr.	198	45	103	198	23
Chipmunk Grazing Association	River Group	72	1	5	3,345	1
	Black Mtn. Field	877	14	40		
B. Collett	Castle Cr. W	910	50	249	3,787	1
Colyer Cattle Co.	Battle Cr. SpSuF	3,395	7	81	4,135	1
O. Cox	Fossil Butte	93	4	19	5,170	1
	Oreana #3	2,725	11	29		
C.T. Ranch Co.	Reynolds Cr. Group	1,594	40	89	2,039	2
	Black Mtn. Field	376	6	18		
A. Curtis	River Group	93	2	8	93	2
Double Anchor Ranch	Hammett #4	404	87	347	3,616	3
	Hammett #5	1,924	9	101		
Faulkner Land & Livestock	Saylor Cr.	5,015	1,130	2,630	5,015	23
Flying Triangle Inc	Saylor Cr.	3,163	713	1,660	3,163	23
Glens Ferry Grazing Assn.	Castle Cr. W	90	5	24	5,581	1
Query, Inc.	Saylor Cr.	250	56	131	5,038	1
Guthries Rancho Idaho	Tindall Northwest	11,501	217	1,255	23,484	1
Half Moon Ranch	Hammett #4	1,035	218	867	1,184	18
W.B. Hall	Saylor Cr.	998	225	524	998	23
Hammett Livstck Co.	Saylor Cr.	6,480	1,461	3,400	11,451	17
	Chalk Flat	110	0	1		
	Hammett #1	120	5	65		
	Hammett #2	55	36	48		
	Hammett #4	314	58	231		
Harley, Jr.	Tindall Northwest	960	18	100	960	2
Hayland Ranches	Oreana #3	465	2	5	1,050	1
E. Jaca	Reynolds Cr. Group	244	6	14	2,691	2
	Black Mtn. Field	2,198	36	100		
J. Jewett	Saylor Cr.	510	115	268	510	23
C. Johnson	Saylor Cr.	175	40	92	175	23
S. Johnson	Saylor Cr.	72	16	38	72	23
C. Johnston	River Group	293	5	22	370	2
	Black Mtn. Field	77	1	4		
G. Johnstone	Poison Cr.	250	0	15	2,449	0
L. Jolley	Saylor Cr.	435	98	228	435	23
Jones & Sandy Livestock	Saylor Cr.	2,670	602	1,401	2,670	23
S. Jones	Saylor Cr.	150	34	79	150	23
Joyce Livestock Co.	Oreana #1	966	5	80	7,212	1
	Oreana #2	4,952	44	207		
	Fossil Butte	1,069	47	220		

TABLE 3-6 (Continued)

(1) Operator	(2) Allotment	(3) Active Grazing Quali- fications (AUMs)	(4) AUMs Included Proposed Action	(5) AUMs Within ES Area	(6) Total AUMs in Boise District	(7) Percent of Local Operation Included in Proposed Action (AUMs) (Col.4+Col.6)
C. Kast	Hammett #4	242	43	174	242	18
D. Keck	Saylor Cr.	800	180	420	800	23
R. Kerbs	Saylor Cr.	2,338	525	1,228	3,103	17
C. Keyan	Saylor Cr.	135	31	70	135	23
G. King	Castle Cr. W	2,155	118	582	8,152	2
Da. Kinyon	Saylor Cr.	724	163	380	1,279	13
De. Kinyon	Saylor Cr.	949	214	498	949	23
K. Kubik	Saylor Cr.	480	108	250	480	23
D. Lahtiner	Battle Cr. SpSuF	1,224	3	28	1,224	1
S. Leguineche	Saylor Cr.	258	58	135	516	11
S. Lehmann	Saylor Cr.	682	154	358	682	23
B. Malmberg	River Group	90	2	7	90	2
H. Markley	Graveyard Point	113	0	40	785	0
L. Maupin	Castle Cr. W	250	13	71	2,454	1
D. McGhehey	Chalk Flat	2,068	7	24	3,246	7
	Hammett #4	1,036	218	867		
R. McKee	Reynolds Cr. Group	81	2	5	81	3
C. McMahon	River Group	489	8	37	615	2
	Black Mtn. Field	126	2	7		
E. Miller	Saylor Cr.	904	204	474	1,784	11
Miller Land Co.	Fossil Butte	213	9	47	2,870	1
J. Mills	Hammett #4	27	6	24	27	22
R. T. Nahas	Nahas Individual	1,463	12	44	9,520	
	Fossil Butte	861	37	178		
	Oreana #3	1,677	6	18		
J. Nettleton	Black Mtn. Field	1,133	18	51	3,304	
	Oreana #1	525	2	43		
	Oreana #2	1,133	10	49		
9-K Ranch	Castle Cr. W	481	26	131	2,933	1
Noh Sheep Co.	Saylor Cr.	315	71	165	1,586	5
Patterson Land & Livestock Co.	Saylor Cr.	625	141	328	625	23
E. Perkins	Saylor Cr.	2,100	473	1,102	2,100	23
R. Pershall	Elephant Butte	92	4	34	404	1
F. Phelps & Sons	Hammett #1	1,632	56	805	1,769	3
J. Potucek	Saylor Cr.	411	92	216	411	23
G. Presley	Hammett #1	1,207	41	588	1,310	3
B. Pruet	Saylor Cr.	413	93	217	413	23
M. Quintana	French John Area	38	0	15	2,383	0
R. King	Saylor Cr.	127	28	67	127	23
R. Ross Estate	Hammett #4	390	73	289	420	17
L. Rudge	Tindall Northwest	390	7	43	390	2
Russell Inc.	Hammett #4	240	44	173	392	11
Salmon Falls Sheep Co.	Saylor Cr.	1,560	352	819	1,560	23
K. Seese	Saylor Cr.	383	86	201	383	23
C. Sellman	Battle Cr. SpSuF	325	1	6	679	1
	Tindall Northwest	354	7	28		
Mrs. T. Spenk	Saylor Cr.	8	2	4	8	23
Simplot Livestock Company	Saylor Cr.	3,048	687	1,599	17,728	4
Sliman Sheep Co.	Saylor Cr.	650	146	341	650	23
J. L. Solosabal	Saylor Cr.	1,080	243	567	1,080	23
R. Steele	Saylor Cr.	413	93	217	413	23
C. Steiner	Fossil Butte	26	1	5	2,160	1
	Castle Cr. W	168	9	48		
B. Stephens	Hammett #3	240	27	67	240	11
Tews Angus Farms	Saylor Cr.	101	23	53	10,546	1
W. Thompkins	Reynolds Cr. Group	1,239	31	69	1,254	3
M. Thompson	Saylor Cr.	1,794	404	940	1,794	23
L. Trail	Saylor Cr.	1,005	226	527	1,005	23
2-Plus Ranches	Hammett #1	1,398	47	675	2,678	11
	Hammett #4	1,235	247	983		
Urquidi & Ocamica	Battle Cr. SpSuF	366	1	10	2,398	1
R. Viner	Hammett #4	473	102	405	539	19
W. Walker	Hammett #4	588	131	519	588	22
Wells Livestock Co.	Saylor Cr.	200	45	105	4,931	1
D. Wicher	Hammett #2	400	266	352	550	54
	Hammett #4	150	29	116		
G. Withers	Chalk Flat	333	1	4	333	1
20 Individual Operators	Sunnyside SpF	25,275	32	53	N/A	1
TOTALS		153,428	14,975	41,397		

SOURCE: BLM grazing case files and 1940, 1959, 1962, 1965 range surveys.

AGRICULTURE

The proposed action would add 111,015 acres of new farmland in three counties during the 1980s. Table 3-7 shows the amount of acres to be developed in each county and an estimate in acres of crops based on the assumed crop rotation discussed in Chapter 1, less three percent for non-crop areas on the farmland.

TABLE 3-7

ACRES OF CROPS BY COUNTY UNDER PROPOSED ACTION

<u>Crops</u>	<u>Elmore</u>	<u>Owyhee</u>	<u>Twin Falls</u>	<u>County Totals</u>
Potatoes	10,909	9,988	2,796	23,691
Dry Beans	10,412	9,533	2,669	22,615
Winter Wheat	8,429	7,717	2,160	18,306
Barley	8,429	7,717	2,160	18,306
Sugar Beets	8,429	7,717	2,160	18,306
Alfalfa	2,974	2,724	762	6,461
Total Crops	49,582	45,396	12,707	107,685

SOURCE: Table 1-2, Chapter 1

MINERAL RESOURCES

Locatables and Leasables

The mineral value of any tract of public land would be evaluated prior to making a disposal. Under the Desert Land and Carey Acts, land "mineral in character" cannot be disposed of unless valuable for leasables only (43 CFR 2520.08) in which case the leasable minerals would be reserved to the federal government. It can thus be presumed that valuable known locatable (diatomite and oolitic limestone deposits) and leasable minerals would be retained in federal ownership and therefore would be open to development. However, any undiscovered potentially valuable mineral deposits could be lost from development under a DLA or CA disposal.

Salables

"Common variety" material (sand and gravel, common borrow) would be transferred to private ownership under the DLA and CA if located on land determined to also be suitable for agriculture. A major consideration of

developing a large amount of desert land is the construction of a transportation network. Projecting from past history of desert land agricultural developments within the ES area, it can be assumed that there would be 1.7 miles of gravel road for each section of new farmland. Roads would be built to road district standards, with a 34-foot wide surface about 8 inches deep.

For 111,015 acres of additional farm development, approximately 300 miles of new road would be constructed, accounting for an estimated 1.3 million cubic yards of gravel. Assuming a hypothetical gravel deposit 2 yards deep, and accounting for waste rock and maintenance needs until paved or oiled roads are completed, it is estimated that between 200 and 300 acres of land would be required for gravel production. Gravel pits would be located on the 37,000 acres of public purpose tracts included in the proposed action. With proper reclamation, any land disturbed for gravel production would be only temporarily removed from other uses. The total area of land covered by 300 miles of road surface would be 1,236 acres, which in practical terms would be permanently removed from other uses.

LAND USE PLANS, CONTROLS, AND CONSTRAINTS

As was mentioned in Chapter 2, all of the counties included in the ES area have developed land use plans; however, none of the counties have enacted any ordinances or restrictions which would implement the county plans. For the most part, county planning recommendations for land in the ES area are fairly broad, not site specific, and do not have restrictions on development of this land for intensive agricultural use. It should be pointed out that even though these plans were devised without the knowledge that large blocks of land within the ES area would be developed for agricultural use, future agricultural use was considered and in a broad sense planned.

Agricultural expansion under the proposed action should not impact the existing county plans. However, the support needs such as commercial, industrial, residential, and public service have not been planned for to meet the increase in demand (see Socio-Economic Impacts). Therefore, county land use plans would have to be updated and revised when farm development commences. It is the intent of BLM to coordinate closely with county agencies in updating their plans if the proposed action is implemented.

Farm development on public land could impact management on some of the 33 state owned parcels in the ES area. These tracts of state land could be difficult to lease for grazing if surrounding DIA and CA development resulted. The same tracts could constitute desirable additions to DIA and CA projects if soils were amenable to crop production. Lost grazing lease revenues could be countered by the state selling the parcels for new farmland expansion. It is impossible to predict what would happen to these different state tracts at this time. Continued grazing or the sale opportunity would depend primarily on what happens on contiguous public land.

TRANSPORTATION SYSTEMS

The amount of land used for roads and utility transportation systems would increase over what is now in existence. Based on the agricultural development of other land in the ES area, new roads would be the single largest change in land use except for the actual agricultural development. Based on existing farm developments in this area, 300 miles of new roads (encumbering 1,236 acres) would be required to serve the proposed farm areas. From 200-300 acres of public land would be needed as a source of material for road construction (see Mineral impacts).

There would be increased truck and automobile traffic volumes on the existing facilities as a result of implementation of the proposed action. Further, with greater volumes maintenance costs will be increased. However higher traffic volumes could indicate more user revenues and gas tax receipts would accrue to the appropriate entities to offset these additional costs. The traffic volumes would not increase enough to warrant upgrading or replacement of the existing facilities.

Utility systems would also be increased, but, as in past development, these systems generally parallel existing or new roads and offer only a visual impact to the existing environment. It is not anticipated that any new large (greater than 245 kv) lines would be constructed in the ES area as a result of agricultural development.

SOCIO-ECONOMIC CONDITIONS

The impacts depicted in this section are generated from a combination of the highest crop prices (1976 Normalized) and the lowest energy prices to irrigators (16.5 mills) as shown in Table 3-8. These high crop prices and low energy prices would be the most favorable circumstances for farmers under the proposed action. Most other combinations of crop and energy prices illustrated in Table 3-8 do not yield positive farm incomes.

The change in earnings and employment discussed in this section was analyzed with the aid of BLM's Dynamic Regional Analysis Model (DYRAM) as shown in Appendix 3-1.

Loss of ranch workers and ranch income was based on the total elimination of livestock grazing in the ES area, once farming was completely established under the proposed action. With such circumstances, 418,580 acres of public land would be closed to livestock grazing. This would represent the worst case situation for livestock operators in the ES area.

Carey Act

Carey Act development of 111,015 acres would result in 347 farm units. The primary employment impacts would be an addition of 347 farmers and a loss of 31 ranch workers. Assuming the highest crop

TABLE 3-8

NET FARM PROFIT AND

PROFIT PER ACRE FOR A 320 ACRE FARM ^{1/}

Energy Prices	B.C. Imports 16.5 Mills Per KWH	New Plant Participation 17.7 Mills Per KWH	Average 18.9 Mills Per KWH	Sale on IPC System 20.1 Mills Per KWH	Sale as Surplus 21.2 Mills Per KWH
Crop Prices					
Net Farm Profit	+\$ 8,519.95	+\$ 7,122.35	+\$ 5,723.91	+\$ 4,325.81	+\$ 3,045.51
Normalized					
Profit Per Acre	+\$ 27.48	+\$ 22.98	+\$ 18.46	+\$ 13.95	+\$ 9.82
Net Farm Profit	-\$ 8,685.57	-\$10,083.17	-\$11,481.61	-\$12,879.71	-\$14,160.01
Normalized					
Profit Per Acre	-\$ 28.02	-\$ 32.53	-\$ 37.04	-\$ 41.55	-\$ 45.68
Net Farm Profit	-\$26,179.85	-\$27,577.45	-\$28,975.89	-\$30,373.99	-\$31,654.29
Actual					
Profit Per Acre	-\$ 84.45	-\$ 88.96	-\$ 93.47	-\$ 97.98	-\$ 102.11

^{1/} Average location of farm under the proposed action, i.e., 650 ft. above Snake River and 4-6 miles pumping distance.

SOURCE: Idaho State Office, BLM, 1979

TABLE 3-9

EMPLOYMENT CHANGES

NUMBER OF JOBS

CAREY ACT

<u>Industry</u>	<u>Due to Livestock Loss</u>	<u>Due to Agriculture Gains</u>	<u>Total</u>
Agriculture			
Livestock (exc. Dairy-Poultry)	-33	8	-25
Other Agriculture	0	417	417
Mining			
Metal	-	-	-
Coal	-	-	-
Oil and Gas	-	-	-
Other Mining	-	-	-
Contract Construction	-	7	7
Manufacturing			
Food & Kindred Prod.	-2	8	6
Lumber and Wood Prod.	-	3	3
Paper and Allied Prod.	-	-	-
Petroleum Refining	-	-	-
Primary Metals	-	-	-
Other Manufacturing	-3	4	1
Transportation & Communication	-1	7	6
Public Utilities	-	1	1
Wholesale & Retail Trade	-2	21	19
Finance, Ins., & Real Estate	-1	4	3
Services	-1	13	12
Government			
Federal	-	8	8
State & Local	-	5	5
Acre Summary	-44 ^a	503 ^a	459 ^a

Source: Bureau of Land Management, Idaho State Office, Dynamic Regional Analysis Model (DYRAM), January 1979

a) Numbers may not add to totals due to rounding.

returns and the most favorable energy costs, gains in the farm sector would create secondary impacts of an additional 70 employees in the farm sector and 86 in the remainder of the market area economy. The decrease in the livestock industry would result in an additional 14 jobs lost. Total employment changes by industry are shown in Table 3-9. The major impacted industries are wholesale and retail trade and services. However, all the sectors of the economy would be affected.

By the year 2000 the labor force would be 70 percent higher than in 1975. The proposed action would slow down the projected decrease in agricultural employment (Idaho Department of Water Resources, 1978).

As a result of the proposed action, the maximum increase in population in the market area would be 1,073. This was based on 1975 employment to population ratios.

The following table describes the new population by age group:

TABLE 3-10

AGE BREAKDOWN OF NEW POPULATION
CAREY ACT

<u>Age Group</u>	<u>Number</u>
75 years	111
5-17 years	308
18-29 years	300
30-44 years	209
45-64 years	109
65 + years	36
	<u>1,073</u>

SOURCE: Idaho State Office, BLM, U.S. Department of Energy, 1978.

Representative farm budgets were prepared by the Idaho Department of Water Resources (see Appendix 3-2).

The farm budget data is based on a 320-acre farm of which 310 acres are considered irrigable. The crops grown are potatoes, barley, winter wheat, alfalfa, dry beans, and sugar beets. The data is presented so that pre-tax net returns per acre may be calculated. The budget prepared by the Idaho Department of Water Resources relies on 1976 normalized prices (1977 custom harvesting production prices) and an electricity rate of 18.9 mills per KWH (Kilowatt hour). This rate was the average of the four scenarios developed in the energy section. the complete budget may be found in Appendix 3-2.

Table 3-8 presents fifteen possible combinations of pre-tax net returns based on three crop returns and five energy costs. With 1976 normalized crop prices, net farm income would range from \$8,520 to

\$3,046. It should be noted that the poverty level for a farm family of four is \$5,270 (U.S. Department of Labor 1978). The reader should be cautioned that the net returns are very sensitive to changes in energy prices and to changes in crop price returns.

Table 3-8 shows that only under the most favorable conditions would a 320-acre farm provide a profitable return on the farmers investment.

Assuming the worst case situation (losing 418,580 acres of grazing land - see Livestock, Chapter 3) and the fact that ranchers in the ES area normally use an average of 92 percent of their grazing privileges they would lose 38,085 AUMs as a result of the proposed action. An AUM in the ES area is worth approximately \$10.86 in income to the ranchers. (Livestock earnings in the ES market area in 1974 totaled approximately \$34,510,000. Dividing total earnings by the total number of AUMs of forage consumed in the region yielded a per AUM average earning of \$10.86). Thus, ranchers would annually lose approximately \$414,000 in direct income.

Four scenarios were analyzed for secondary impacts: 1) Net farm income of \$8,520 per farm, 2) Net farm income of \$3,046 per farm, 3) Net farm income of - \$26,180 per farm, and 4) Net farm income of - \$31,654 per farm. These are the four extreme cases of the previous analysis involving energy costs and crop returns.

In the first case, earnings in the market area would increase by more than \$4.7 million. The livestock sector would lose income and the remaining agriculture sector would gain as do all the others. In the second case, the livestock sector would lose earnings. Under the third and fourth cases all sectors in the economy would lose earnings through secondary impacts, the difference between the two being a matter of degree. Case four presents more severe losses (see Table 3-11).

Implementation of the proposed action would lead to an increase of approximately 308 children in the 5-17 age group and an increase of 277 new school pupils - 200 elementary, 77 high school. These students would require 22,080 square feet of elementary classroom space and 11,590 square feet of high school classroom space (U.S. Department of Energy, 1978). If sufficient space were not available in the market area, it would cost roughly \$1.2 million dollars to build the necessary space. Table 3-12 shows how the counties would be impacted (see Appendix 3-3 for methodology).

Total public capital costs that may be required could reach a maximum of \$3.1 million. It is anticipated that public costs would be below this figure. Under 1977 average mill levys, the three counties in the ES area would receive \$1.8 million in property taxes (see Appendix 3-4). The counties would not obtain these revenues until the land is deeded to the applicant.

Desert Land Act

The number of acres developed into farms and the number of acres taken out of livestock production would be the same as under the Carey Act. Due to the lack of a residency requirement under the DLA, it is

estimated that only 10 percent of the farms would have resident owner/operators. The remainder of the farms would have non-resident owner/operators who maintain their residence somewhere in the market area. The returns per acre for farming would be the same as under the Carey Act; the net farm income would double from that shown in Table 3-8.

The primary employment impacts would be an addition of 174 farmers and a loss of 31 ranch workers. Since secondary employment impacts are based on earnings, they would be the same as under the Carey Act. Total employment changes by industry are shown in Table 3-13. The major impacted industries are wholesale and retail trade and services. However, all the sectors of the economy would be affected.

By the year 2000 the labor force would be 69 percent higher than in 1975. The proposed action would slow down the projected decrease in agricultural employment (Idaho Department of Water Resources 1978).

As a result of the proposed action the maximum increase in population in the market area would be 672. This was based on 1975 employment to total population ratio.

TABLE 3-11
CHANGES IN EARNINGS FOR MAJOR
ECONOMIC SECTORS AND FOR THE
ES MARKET AREA

(000's)

<u>INDUSTRY</u>	<u>CASE 1</u>	<u>CASE 2</u>	<u>CASE 3</u>	<u>CASE 4</u>
Livestock	\$ -388	\$ -401	\$ -738	\$ -802
Other AG.	+4,323	1,542	-13,308	-16,090
Food & Kindred	+41	0	-215	-256
Wh & Ret. Trade	+154	41	-561	-674
Services	+136	40	-466	-561
Other Industries	+395	103	-1,465	-1,757
Total	\$ 4,711	\$ 1,325	\$-16,753	\$-20,140

Source: Idaho State Office, Bureau of Land Management, 1979

TABLE 3-12
 IMPACTS RESULTING FROM
 THE CAREY ACT

	Owyhee	Elmore	Twin Falls	Canyon	Area Summary
Workers	170	186	49	53	459
Population	398	435	115	124	1,073
Children	114	129	33	36	308
School Children	103	113	29	33	277
Elementary	74	82	22	23	200
High School	29	31	7	10	77
Elem Sq. Ft.	8,915	9,755	2,572	2,787	24,028
H.S. Sq. Ft.	4,300	4,706	1,241	1,344	11,590
Cost of School Construction	\$ 449,357	\$491,750	\$129,599	\$140,500	\$1,211,206
Cost of School Furnishings	\$ 53,914	\$ 59,000	\$ 15,550	\$ 16,857	\$ 145,321
Number of Teachers	4	5	1	2	13
Health Care Personnel	4	5	1	2	13
Fireman & Policeman	2	3	1	1	8
Cost of Public Facilities	\$ 583,816	\$ 638,894	\$168,378	\$182,542	\$1,573,630
Maximum Total Public Capital Costs	\$1,131,028	\$1,237,729	\$326,200	\$353,637	\$3,048,593

Source: U.S. Department of Energy, 1978 and Idaho State Office, Bureau of Land Management

Note: Numbers may not add up to totals due to rounding.

TABLE 3-13

EMPLOYMENT CHANGES
NUMBER OF JOBS
DESERT LAND ACT

<u>Industry</u>	<u>Due to Primary Livestock Loss</u>	<u>Due to Primary Agricuilt. Gain</u>	<u>Total</u>
Agriculture			
Livestock	-33	+8	-25
Other Agriculture	0	+246	+246
Food and Kindred	-3	+8	+5
Wholesale & Retail Trade	-3	+21	+18
Services	-1	+13	+12
Other	-5	+36	+31
Total	-45	+332	+287

SOURCE: Idaho State Office, Bureau of Land Management, Dynamic Regional Analysis Model, January 1979.

The following table describes the new population by age group:

TABLE 3-14

AGE BREAKDOWN OF NEW POPULATION
DLA

<u>Age Group</u>	<u>Number</u>
75 years	69
5-17 years	192
18-29 years	189
30-44 years	131
45-64 years	68
65 + years	23
	<u>672</u>

SOURCE: Idaho State Office, BLM, U.S. Department of Energy, 1978

The change in earnings in the market area would be the same with the Desert Land Act as with the Carey Act.

Implementation of the proposed action via provision of the Desert Land Act would lead to an increase of approximately 192 children in the 5-17 age group. This would mean an increase of 173 new school pupils - 125 elementary and 49 high school. These students would require 14,990 square feet of elementary classroom space and 7,287 square feet of high school classroom space (U.S. Department of Energy 1978). If sufficient space were not available in the market area, it would cost roughly \$882,000 to build the necessary space. Table 3-15 shows how the counties would be impacted.

Total public capital costs that may be required could reach a maximum of \$1.7 million. It is anticipated that public costs would be below this figure. Revenues received by the counties would be the same as with the CA.

Social Values

It is anticipated that approximately 40 percent of the DLA and CA applicants would be ranchers or farmers and that most of the applicants would be from Idaho or other rural areas. They would hold the same values as the existing residents. The result would be little change in lifestyle. The role of the schools and churches would be strengthened slightly. Some new organizations would develop as population increases. These would be farm related. There would be little attitude change by residents towards their social well-being as they feel that they have a lifestyle better than the more urbanized people. The increased number of "like-kind" residents would tend to solidify this type of lifestyle.

The increase in the number of groups would further fragment the power structure in the ES counties. There may be some resentment by current area residents toward new-comers. Increased farm competition may also cause some resentment between current residents and new-comers.

There would be an increase in agricultural employment opportunities that would be attractive to illegal aliens if the proposed action is implemented. The numbers of illegal aliens attracted is dependent on the method of irrigation used. According to the U.S. Immigration Service if hand moved sprinkler systems are used, upwards to 90 percent of the pipe movers are likely to be illegal aliens. An increase in illegal aliens in this area would place an additional burden on the already overtaxed U.S. Immigration Service. There would also be an adverse impact on the communities of the area because of the introduction of a separate society constituted of illegal aliens. Further social impacts will be felt particularly in the areas of law enforcement, public health and education. It is important to realize, however, that hiring illegal aliens is the choice of the employer and the BLM has no control over private hiring practices.

Crop Prices

In a report prepared for the BLM by Dr. Leroy Blakeslee of Washington State University it was stated that "In general, the analysis suggests that...the price effects would be moderate" under the proposed action. This report, which was based on a 1979 PhD dissertation by Edmund Estes (Estes, 1979) goes on to say that "to a large extent the new production would simply replace existing production both in the northwest and elsewhere" (Blakeslee 1979).

Under the proposed action, with 23,691 acres of potatoes after five years, it is estimated that Pacific Northwest (PNW) potatoes prices would drop about 7 cents per hundred weight (cwt), while the U.S. average potato price would drop about 9 cents per cwt. By 1984 production outside the PNW would be about 3.18 million cwt less than if the development did not take place. Production on pre-existing PNW farms would also be down, approximately 2.85 million cwt below what it would be without development. With 7.46 million cwt production from the study area, the total PNW production would be 4.61 million cwt higher (7.46 new production less 2.85 pre-existing) and total U.S. production would be 1.43 million cwt higher as a result of the proposed action.

The price effects are relatively minor since most of the effects take the form of displacements of production on producing farms which existed prior to new farm development in the ES area. The exact degree of displacement depends on how rapidly the new production comes on line and on how much time is allowed for adjustment. As Dr. Blakeslee's report states, "the displacement effect need not represent a great decline in economic well-being among those who leave or reduce potato production. This is because it is not the average producing unit which leaves under such circumstances. Rather, it is the one for which potato production was originally only a marginal choice relative to the next best economic alternative. Presumably, not much economic well-being is lost when such units take up the next best alternative rather than continue in potato production" (Blakeslee 1979).

In summary, the proposed action would lower potato prices slightly (7 cents in the PNW and 9 cents in the U.S.), total production would increase, and some marginal potato producers would discontinue producing potatoes and take up the next best alternative. It is not anticipated that there will be a noticeable effect on other crop commodity prices.

TABLE 3-15
DESERT LAND ACT
LOCAL SERVICES

	Owyhee	Elmore	Twin Falls	Canyon	Area Summary
Workers	97	105	28	57	287
Population	227	248	65	133	672
Children (5-17 yrs)	65	71	19	38	192
School Children	59	64	16	35	173
Elementary	42	46	13	24	125
High School	16	19	5	9	49
Elem Sq. Ft.	5,052	5,516	1,454	2,968	14,990
H.S. Sq. Ft.	2,456	2,681	707	1,442	7,287
Cost of School Construction	\$255,245	\$278,725	\$ 73,469	\$149,966	\$ 757,405 ^{1/}
Cost of School Furnishings	\$ 30,629	\$ 33,447	\$ 8,816	\$ 17,996	\$ 90,889
Cost of School Land	\$ 11,436	\$ 12,487	\$ 3,292	\$ 6,719	\$ 33,932
Number of Teachers	2	4	1	1	8
Health Care Personnel	2	3	1	1	8
Fireman and Policeman	1	2	0	1	5
Cost of Public Facilities	\$332,125	\$362,676	\$ 95,597	\$195,136	\$ 985,533
Total Public Capital Costs	\$563,348	\$615,169	\$162,151	\$330,987	\$1,671,654

Source: U.S. Department of Energy and Idaho State Office, Bureau of Land Management

Note: Numbers may not add up to total due to rounding.

^{1/} All dollar figures are in constant 1975 dollars.

Impact Summary

Carey Act

Implementation of the proposed action via provisions of the Carey Act would lead to increased employment by 459 jobs and an increase in population of 1,073. Total earnings could increase as much as \$4.7 million. There would be 308 more school children which would require 13 new teachers. The increased population would require 13 additional health care personnel and 8 additional firemen and policemen. The cost of required public facilities could be as much as \$1.6 million, and the total public capital costs could reach \$3.1 million.

Desert Land Act

Implementation of the proposed action via provisions of the Desert Land Act would lead to increased employment by 287 jobs and an increase in population of 672. Total earnings could increase as much as \$4.7 million. There would be 173 more school children which would require 8 new teachers. The increased population would require 8 additional health care personnel and 5 additional firemen and policemen. The cost of required public facilities could be as much as \$985,533 and the total public capital costs could reach \$1.7 million.

ENERGY

The energy impacts of the proposed action were assessed by estimating the amounts of various energy forms that would be consumed by the proposed action and then analyzing the impact that this consumption would have on future demand, supply, and cost. An evaluation of total per-acre and farm unit energy consumption as well as an analysis of the energy input and output for various crops was also performed.

Electrical Energy

Estimation of Electricity Use

Direct Consumption: The calculation of electrical consumption for the proposed action was based primarily upon a determination of lift heights and distances from the river for the parcels of land that make up the proposed action.

Through a combination of contour lines and distance lines from the river, the ES area was divided into a lift height/distance grid such that for any particular parcel of land the closest distance to the river and the lift height from that point in the river could be determined. The number of acres for each combination of lift height and distance was then totaled. Distance intervals ranged from between 0-2 miles up to 16-18

miles from the river; lift heights ranged from 0-100 feet up to 1,300-1,400 feet (see Appendix 3-5, Table A). Out of approximately 99,000 acres assumed to be irrigated out of the Snake River (see Appendix 3-5 and Table 1-3, Chapter 1) the median distance was 6 to 8 miles from the river and 600 to 700 feet of lift.

For the approximately 11,000 acres assumed to be irrigated out of wells, existing well data was studied to determine a reasonable estimate of lift height to assign to wells. Well pumping depths in the central portion of the ES area range from 0 to over 350 feet; 100 feet was taken as an approximate average depth. All well-irrigated land was therefore evaluated on the basis of a 100-foot lift and zero distance from the water source.

Including well-irrigated land, the median lift height and distance for all acres in the proposed action would be 600-700 feet and 4-6 miles from the water source.

With the estimated lift heights and distances for all land in the proposed action, it was possible to calculate the per-acre energy consumption for each lift height/distance combination, given assumptions numbers 9, 10, 11, 12, and 13 at the beginning of this chapter.

Using the "average year" assumed diversion of 2.58 acre-feet/acre and corresponding monthly distribution (see Chapter 2, Energy), the per-acre energy requirement (in KWH/acre) was calculated by month and for the whole season for each lift height/distance combination. The seasonal energy requirements per acre range broadly, from 939 KWH/acre for land with the lowest lifts and closest to the river to over 6,600 KWH/acre for land with a lift of 1,300-1,400 feet and 10-12 miles from the river (See Appendix 3-5, Table B).

The electricity consumption for land with median lift height and distance (600-700 feet, 4-6 miles) is 3,478 KWH per acre. About 87 percent of the land to be irrigated out of the river has a higher per-acre electricity requirement than the 1977 average of 2549 KWH per acre for existing developed land in the ES area (see Appendix 3-5, Table B). The 3478 KWH per acre for the typical (median) acre in the proposed action is six times the estimated 575 KWH per acre average electricity consumption for all irrigated acres in south Idaho.

Calculations of proposed action electricity consumption were also made for a "worst case" or simulated drought year. This was done because the drier conditions and increased water use for irrigation in drought years generally coincide with low streamflows and reduced generating capability on the Idaho Power Company (IPC) hydro system. This "worst case" or drought year resembles a year like 1977. However, 1977 was not a drought year in a total sense in that precipitation during the irrigation season was above normal. Actual diversions closely approximated the norm. A low-water year, such as 1977, occurs about one year in eight.

The "worst case" differs from the "average case" year in that the diversion is estimated at 3.51 instead of 2.58 acre-feet/acre, and the monthly distribution shifts toward the spring, with peak water application occurring in June rather than July (see Appendix 3-5, Table C). This shift apparently occurs when natural rainfall is lacking and heavy water application must begin earlier in the season. The average and worst case monthly water distributions are compared in Table 3-17.

Electricity requirements for the "worst case" water year run from 1,277 KWH/acre to 9,019 KWH per acre, with a value of 4,736 KWH per acre for land with a median lift height and distance. In the "worst case" year, 96 percent of all the land to be irrigated out of the river has a per acre electricity requirement higher than the 1977 average for the area.

Tables 3-18 and 3-19 (line 1) show the direct electricity consumption, by month, for the "average year" and the "worst case" year in average megawatts. In each case, the total monthly consumption is the sum of the monthly consumption for all the acres in each lift height/distance combination.

The highest demand in the average case occurs in July with 136 average MW; the worst case demand peaks in June with 178.7 average MW.

The actual generation requirement necessary to serve the proposed action, or the "direct load", exceeds the proposed action consumption by about 8.5 percent due to transmission and distribution line losses. The direct load is shown in line 2 of Tables 3-18 and 3-19.

Table 3-17

WATER DISTRIBUTION - AVERAGE AND WORST CASE YEARS

	Average Year Water Application		Worst Case Year Water Application	
	%	Acre Feet	%	Acre Feet
April	4	.10	6	.21
May	10	.26	12.5	.44
June	23	.59	24.5	.86
July	27	.70	22.5	.79
August	21	.54	19.1	.67
September	12	.31	11.4	.40
October	3	.08	4	.14
TOTAL	100%	2.58	100%	3.51

SOURCE: Idaho Department of Water Resources and Integrated Energy Systems, Inc. Boise, Idaho. (Contract No. YA-512-CT8-226).

Table 3-18

ELECTRICITY CONSUMPTION BY PROPOSED ACTION
(ave MW)

- Average Year -

	Apr	May	June	July	Aug	Sept	Oct	Total (MWH)
Direct Consumption	20.8	50.3	119.4	135.7	105.5	62.3	15.1	373,850
Direct Load*	22.7	54.9	130.5	148.3	115.3	68.1	16.5	408,557
Indirect Consumption (Hydro losses on IPC system)	7.7	21.5	53.0	60.0	46.1	26.2	4.9	161,731**
Total Load on IPC system (Direct load & Hydro losses)	30.4	76.4	183.5	208.3	161.4	94.3	21.4	570,288

* Direct Consumption/.915 = Direct Load (includes line losses)

** Net losses over irrigation season.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho.
(Contract No.YA-512-CT8-226)

Table 3-19

ELECTRICITY CONSUMPTION BY PROPOSED ACTION
(ave MW)

- Worst Case -

	Apr	May	June	July	Aug	Sept	Oct	Total
Direct Consumption	43.8	88.2	178.7	158.8	134.8	83.1	28.2	525,154
Direct Load*	47.8	96.4	195.3	173.6	147.3	90.9	30.9	573,906
Indirect Consumption (Hydro losses on IPC system)	16.7	37.3	74.6	66.7	55.0	32.7	9.3	214,506**
Total Load on IPC system (Direct load & Hydro losses)	64.5	133.7	269.9	240.3	202.3	123.6	40.2	788,412

* Direct Consumption/.915 = Direct Load (includes line losses)

**Net losses over irrigation season

Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

Indirect Consumption: In assessing the total electrical impact of the proposed action, the loss in generating capability at downstream dams due to proposed action diversions must be considered. Tables 3-18 and 3-19 (line 3) show the net losses on the Idaho Power Company dams that would result from proposed action water diversions during the irrigation season in the "average" and "worst case" years (see Appendix 3-5 for hydro loss calculations). The net hydro losses over the whole year would be slightly less since it is assumed that some of the water irrigated percolates back to the river throughout the year. The water percolated back to the river creates a minor increase in streamflow and therefore in generating capability in non-irrigation months (see Appendix 3-5).

Total Consumption: The total load the proposed action places on the IPC system can be calculated by adding the direct load, including line losses, to the hydroelectric losses. The resulting total load, by month, is shown in Tables 3-18 and 3-19 for "average" and "worst case" years.

Supply and Demand

The impact the "average year" additional load would have on the present IPC system is illustrated in Figure 3-8. The solid line is IPC-owned 1978 resources modified for median water conditions; the dotted line is the forecast 1978 load, and the dot-dashed line is the 1978 load plus the average proposed action load.

Figure 3-9 illustrates the proposed action impact in a "worst case", or drought year. The solid line is IPC-owned 1978 resources modified for 1977 (drought) water conditions. It reflects the decreased hydro capability in a low water year. The dotted line is the 1977 actual load, showing a drought-year type load. The dot-dashed line is the sum of the 1977 load and the proposed action "worst case" load.

It is clear that the electricity demand of the proposed action cannot be met by current company-owned generating resources in either the "average" or the "worst case" year. Existing firm purchase contracts under which IPC currently receives additional summer resources are scheduled to expire before farms under the proposed action would be in full production. If the proposed action is implemented, the resulting electricity demand would have to be met through acquisition of additional electricity supplies. As discussed in Chapter 2, Future, the future source and cost of additional electricity cannot be predicted with certainty. Electricity supply to meet proposed action load and resulting cost will therefore be discussed in the context of the supply cost scenarios outlined in Chapter 2, Future.

Self-Sufficiency Scenario: There are two ways in which IPC could expand its system to accommodate the proposed action load. The first, to be called Case 1, would be to build new generating capacity in which case the new output would be added to the IPC system year-round, not just when

needed in the summer. The other possibility (Case 2) is that IPC might be able to purchase a part interest in a new plant being constructed by another utility and take its portion of the output only in the summer months to meet the new demand.

In Case 1, it will be assumed that 260 MW of coal fired generating capacity would be added by IPC to meet the peak demand of the proposed action in the average year. The July load of the proposed action is 208.3 MW. A 260 MW plant running at an average of 80 percent of maximum output would be required to meet this load. If IPC built to meet peak demand for the "worst case" year, a 350 MW plant would be required, and costs to the system would be higher. Based on a range of 1977 constant dollar cost estimates, 40 mils per KWH would be a reasonable figure for the electricity cost from this plant. The annual cost of this plant to the IPC system would depend on IPC's ability to sell the portion of the new output not required by the proposed action.

Under the circumstances of the self-sufficiency scenarios (case 1), it could be postulated that a coal-fired generating plant would be sited somewhere in southern Idaho. Idaho Power Company is considering the construction of a 1000 MW plant in its long range plans, at one of three sites in the late 1980s or early 90s. The three locations are at Bliss and American Falls adjacent to the Snake River and at Sids Crossing, about half way between Shoshone and Minidoka. Such a plant would be sited on the Union Pacific Railroad and would use coal hauled in by train from mines in Wyoming.

For purposes of analysis, two possible situations for disposing of the excess power will be discussed: Situation "A" - IPC would find enough new non-agriculture customers to buy up the rest of the power at system average price, or Situation "B" - IPC would be forced to export the power at an average of 10 mils per KWH (a reasonable price estimate for surplus export power).

In situation "A", if enough new customers were found to buy the excess power, the new plant could be assumed to run at an annual average of 75 percent of maximum output, thus producing 1.71 billion KWH per year at a cost of \$168.3 million. The system average price would increase from 116.3 to 20.5 mils per KWH.

In situation "B", if IPC had to export the excess power at a low price, the new plant could reasonably be assumed to operate at 65 percent of maximum output and produce 1.48 billion KWH per year. The decreased output would result in an increased plant operating cost, from 40 mils per KWH to 44 mils per KWH. Total annual cost to the IPC system would be \$65.1 million, and the system average price would increase from 16.3 to 21.6 mils per KWH.

In case 2, the other possible way of achieving self-sufficiency would be through the purchase of shares of new power plants built by other utilities. It is unlikely that by doing so IPC would be able to exactly match their load, but to give a conservative estimate, it will be assumed that IPC could buy precisely the amount demanded by the proposed

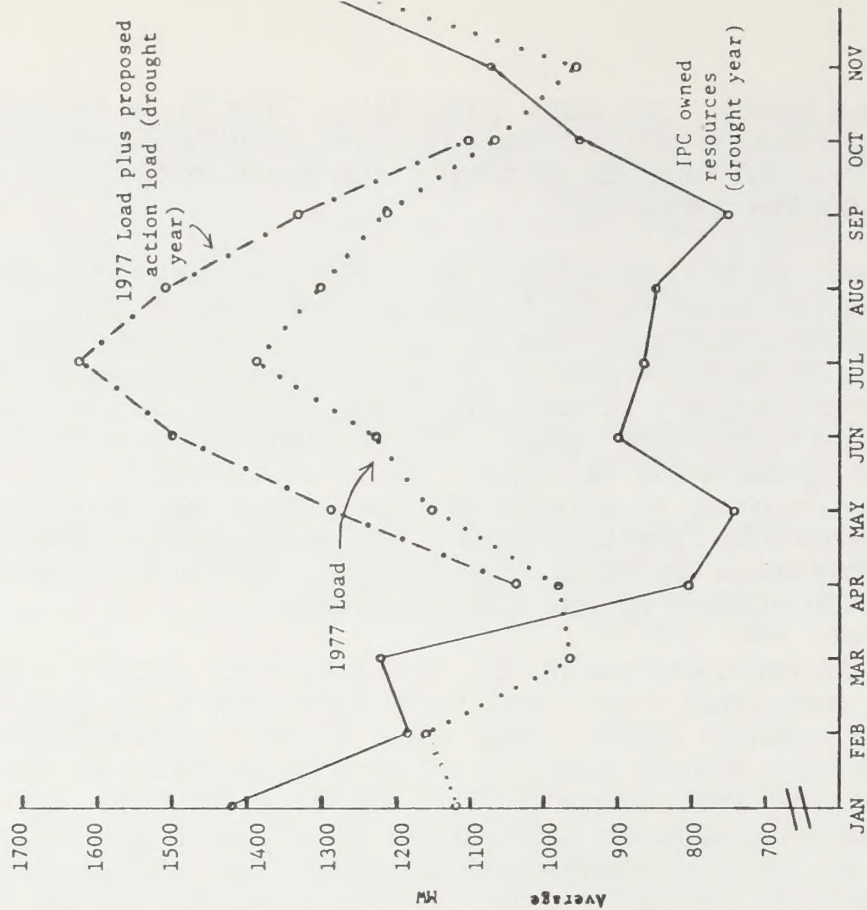


Figure 3-9

DROUGHT YEAR IMPACT OF PROPOSED ACTION ON IPC RESOURCES AND LOAD

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

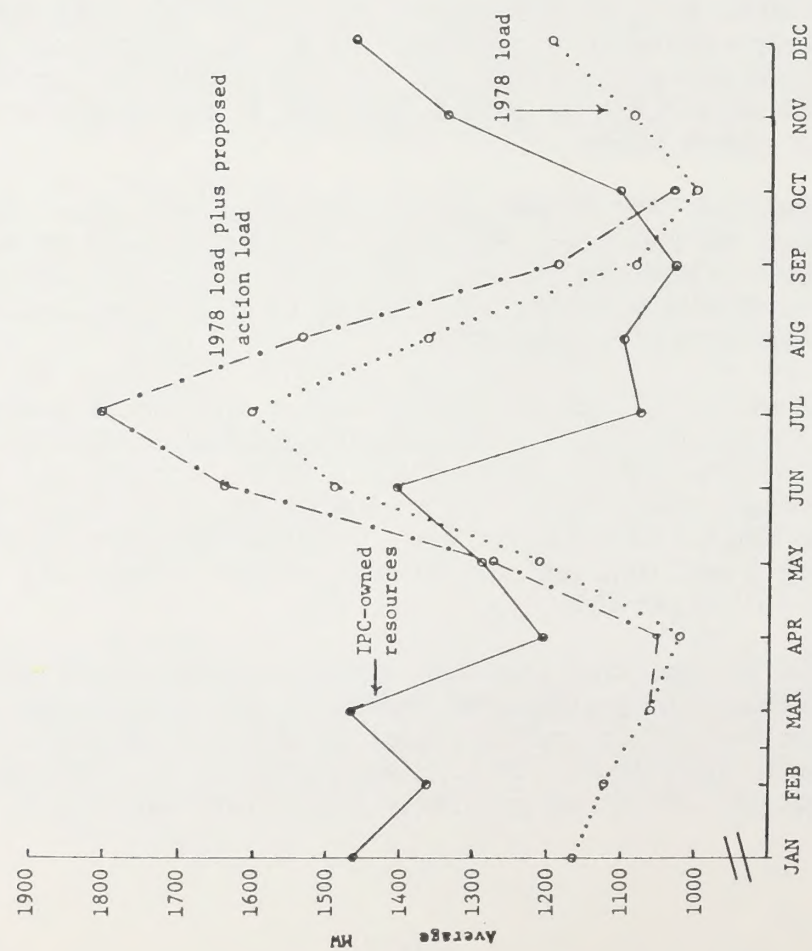


Figure 3-8

IMPACT OF PROPOSED ACTION ON IPC RESOURCES AND LOAD (AVERAGE YEAR)

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

action over the irrigation season in an average year. (Again, IPC might purchase for the "worst case" year, in which case costs would be higher.) The new purchase, then, would be 569.3 million KWH at 40 mils per KWH, or \$22.8 million per season. As a result of this purchase, system average price would increase to 18.0 mils per KWH.

Reliance on Outside Sources: In this scenario, which will be labeled case 3, the demand of the proposed action is assumed to be met with imported power (purchases of electricity rather than part ownership of other plants). In this case the new supply could potentially be matched closely to the demand. It will be assumed that purchases could be made to serve the proposed action only during the months of June, July, August, and September, but not in April, May, or October when IPC-owned resources would be sufficient. The amount required in an average year would be 475 million KWH. Given a British Columbia (assumed to be more probable than purchase of BPA power) price of 25 mils per KWH, the annual cost would be \$11.9 million; the new system average price would be 17.0 mils per KWH.

"Most Likely" Scenario: The four scenarios discussed above represent an estimation of the middle range of possible future supply sources. Less costly scenarios such as Bonneville Power Administration (BPA) power made available by Domestic and Rural Power Authority (DRPA)-type legislation, discussed in Chapter 2 Future section, and more costly scenarios such as building plant to meet worst case rather than average year loads were not examined in detail.

If a "most likely" scenario were to be chosen, then, on the basis of policy trends in recent years, it would have to be one of the "self-sufficiency" alternatives. Case 1, the building of 260 MW of IPC owned generating capacity, is representative of policy recommendations of the Idaho State Water Plan as discussed in Chapter 2 Future, as well as IPC's proposal to build a "Pioneer" power plant. The Pioneer power plant proposal has been before the IPUC in various forms for the past several years. Of the two sub-cases of Case 1 dealing with IPC's ability to sell the output of this plant outside the irrigation season, situation "B", where IPC has to export the power as surplus at 10 mils/KWH, is a great deal more likely than situation "A". Given the predictions that IPC's peak demand will continue to occur in the summer (Chapter 2, Future), it is unlikely that IPC would be able to find a market for the off-season power at the system average price. Case 2, IPC participation in plants built by other utilities, is another form of "self sufficiency" and should be included as a "likely" scenario. Case 3, importing power from British Columbia, is less likely given current policy trends. In sum, then, the most likely of the middle-range supply and cost estimates would be cases 1B and 2.

Impacts on IPC Ratepayers

The principal energy impact of the proposed action would be increased electricity prices to IPC consumers that would result from the addition of new supply to meet proposed action electricity demand.

In order to quantify and assess these impacts, the new electricity

TABLE 3-20

IMPACT OF PROPOSED ACTION ON CUSTOMER PRICES

	CASE 1			CASE 2**	CASE 3
	BASE 1977	IPC ADDS 260 MW CAPACITY SITUATION "A" SALE OF OFF-PEAK POWER	IPC PARTICIPATION IN NEW PLANTS		
COST OF NEW SUPPLY (mils/KWH)		40	44	40	25
AVERAGE PRICES: (mils/KWH) System	16.3	20.5	21.6	18.0	17.0
*Irrigators	16.0	20.1	21.2	17.7	16.7
Residences	20.7	26.0	27.4	22.9	21.6
Small Commercial (Sched. 12)	22.5	28.3	29.8	24.8	23.5
Large Commercial (Sched. 19)	12.5	15.7	16.6	13.8	13.0
AVERAGE YEARLY INCREASE TO 1977 CUSTOMERS (\$/year)					
*Irrigators		677	852	279	114
Residences		74	93	30	12
Small Commercial		554	699	220	95
Large Commercial		35,214	44,431	14,202	5,462

* Corresponds roughly to the seasonal use of a 100 H.P. pump.
 ** Most likely cases.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

Table 3-21

TOTAL COST OF PROPOSED ACTION TO IPC SYSTEM

(MILLION \$)

	CASE 1		CASE 2**	CASE 3
	Situation A	Situation B**		
TOTAL INCREASE TO SYSTEM	68.3	65.1	22.8	11.9
REVENUE FROM PROPOSED ACTION	7.5	7.9	6.5	6.2
REVENUE FROM OFF-PEAK SALES TO OTHER CUSTOMERS	21.4	8.4	--	--
NET COST TO 1977 IPC SYSTEM	39.4	48.8	16.3	5.7

** Most likely cases.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

Table 3-22

PER ACRE COST OF PROPOSED ACTION TO IPC SYSTEM

(\$)

	CASE 1		CASE 2**	CASE 3
	Situation A	Situation B**		
COST OF PROPOSED ACTION	615	586	205	107
REVENUE FROM PROPOSED ACTION	68	71	59	56
COST RECOVERED BY OFF-PEAK SALES TO OTHER CUSTOMERS	193	76	--	--
COST BORNE BY 1977 IPC CUSTOMERS	355	440	147	51

** Most likely cases.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

supply and cost that would result from meeting the proposed action load were "rolled into" the 1977 IPC operating year. This provides a measure, in 1977 dollars, of the cost impact that the proposed action would have on existing IPC customers assuming that the present electricity rate system is in effect. The first step was to calculate a new IPC system average electricity price that includes the sales and cost of the new electricity supply. New average prices to each customer class were then calculated based on the new system average price. (For further explanation of these calculations, see Appendix 3-5.) These 1977 base prices plus new average prices for each of the supply scenarios are shown in the top half of Table 3-20. The new prices and the average electricity use for a customer in each class were used to calculate the increases in annual electric bills are shown in the bottom of Table 3-20.

Table 3-21 shows the annual cost of each supply alternative to the IPC system as a whole and the distribution of these total costs between the proposed action irrigators and existing IPC customers. In the most likely cases the proposed action irrigators would pay \$7.9 million in Case 1B or \$6.5 million in Case 2, leaving 48.8 million or 15.8 million to be absorbed by other IPC customers. Table 3-22 shows these total annual costs and their distribution on a per-acre basis. In Case 1B the proposed action farmers would pay an average of \$71 per acre per year and other IPC ratepayers would pay \$440 per acre per year. In Case 2 these per-acre figures would be \$59 to new irrigators and \$147 to other IPC ratepayers.

The overall economic impact of the two most likely cases would be an increase of 32 percent in Case 1B or an increase of 11.0 percent in Case 2 over 1977 IPC revenues. The economic impact of these costs would vary both between different customer classes and between individual customers within each class.

Increased electricity bills to residential customers would be \$93 per year in case 1B and \$30 per year in Case 2. For affluent residences such an increase spread over 12 months may not be considered significant. For residences with electric heat and for low income households the impact of such increases could be severe.

Lower income households generally pay a much higher portion of their household income on electricity bills than average income households. Increases in the cost of basic necessities including electricity would cause severe hardships to low income households.

For the commercial - industrial customers the impact would depend on the portion of total costs of operation accounted for by electricity costs. For small commercial (Schedule 12 customers) the increase in annual costs would be \$699 in Case 1B or \$220 in Case 2. For large commercial customers (Schedule 19) the increased costs are great - \$44,431 or \$5,462 - for average annual usage.

The overall impact on irrigation customers of IPC is potentially significant. There are about 10,000 irrigation customers that rely at least to some extent on electricity to irrigate crops. The impact, however, would be expected to vary considerably between individual irrigators and depend on such factors as lift and distance from water source,

type of crop, and amount of land irrigated.

The increased cost per year to "average" irrigator shown in Table 3-20 is either \$279 or \$852 per year for the two most likely cases. These increases are calculated from the average 1977 irrigation electricity use which corresponds roughly to the seasonal use of a 100 HP pump. For the irrigator who uses the 1977 average of 939 KWH per acre, irrigation cost increases would be \$4.88, or \$1.60 per acre. For currently irrigated land in the ES area using the average of 2549 KWH/acre, the increase in cost in Case 1B would be \$13.25 per acre or \$4.30 per acre in Case 2. For a 5,000 KW high-lift pump station, the increased cost would be about \$47,000 per season in Case 1B.

Since implementation of the proposed action would cause a significant increase in electricity costs for pump irrigators, it is possible that some existing irrigated land would be forced out of production. Recent history suggests that electricity costs will continue to rise at a steady and rapid rate while commodity prices fluctuate. Over the long run, if the proposed action is implemented, the economic impact on existing agriculture is likely to increase with increased energy costs. In addition, the competition from proposed action agricultural production could increase the economic pressure on existing pump irrigators.

Implementation of the proposed action, as previously described, would require a sizeable commitment of electricity resources. This commitment may be viewed in terms of a trade-off for increased agricultural production in South Idaho. However, to the extent that the energy subsidy necessary to maintain the proposed action in operation increases the economic pressure on existing farms, it is questionable whether the proposed action would actually result in significant long term increases in agricultural production.

Regional Impacts

The water diversions and downstream hydroelectric losses caused by the proposed action are not limited to the IPC service area. The hydroelectricity lost to the Pacific Northwest (PNW) as a result of streamflow depletions is electricity that is in demand in the Northwest or in California to replace oil and natural gas-fired generation. Assuming a total loss of 617.7 KWH per acre foot of water diverted above the eight FCRPS dams on the Snake and Columbia Rivers (see Chapter 2 and Appendix 3-5), proposed action hydroelectric losses on the BPA system were calculated for both the average and worst case year. These are displayed in Table 3-23. The assumption of percolation back to the river over a ten-month period would result in some slight increases in generation in the off-season months. Adding in these increases, the net losses on the FCRPS system would amount to 148,975 MWH in the "average" years and 207,633 MWH in the "worst case" years.

The cost associated with these losses can be estimated by using 35 mils per KWH, the value associated with replacing these lost KWH with the output of a mixture of new coal and nuclear plants. In the average year, this cost would be \$5.2 million; in the worst case year, \$7.3 million. On a per-acre basis (divided by 111,015), this amounts to \$47 per acre in

the "average" year and \$65 per acre in the "worst case" year. These costs would be in addition to those absorbed by the IPC system.

However, in the case in which IPC builds a 260 MW plant and exports excess production at 10 mils per KWH, this cheap IPC-generated electricity would mitigate the PNW hydro losses and, in fact, provide a new benefit to the non-IPC portion of the PNW. (See Appendix 3-5).

Table 3-23

HYDROELECTRIC LOSSES ON THE PACIFIC NORTHWEST
DUE TO THE PROPOSED ACTION

	(Ave MW)							Total
	Apr	May	June	July	Aug	Sept	Oct	(MWH) *
Average Year	7.9	21.5	50.4	57.4	43.6	24.9	4.9	154,799
Worst Case Year	17.3	36.3	73.2	70.2	53.9	32.1	9.3	214,879

* Total losses April - October

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

Chemical Energy

The total consumption of fuels, fertilizers, and pesticides by the proposed action can be calculated from the per-acre consumptions of these materials for various crops (see Table 2-23, Chapter 2). The long-term crop rotation assumed for the proposed action is 22 percent potatoes, 35 percent grain (combining, barley and winter wheat), 17 percent sugar beets, 21 percent beans, and 6 percent alfalfa. Of the total 111,015 acres in the proposed action, these materials are assumed to be applied to 97 percent, or 107,685 acres, leaving 3 percent for farmsteads, waste, etc. Proposed action consumption, total Idaho consumption, and proposed action consumption as a percent of Idaho consumption are shown in Table 3-24.

The amount of these chemical energy forms that would be used by the proposed action is small compared to total Idaho consumption. As a result the proposed action would not have a measurable impact on the supply and cost of gasoline, diesel, or energy forms (natural gas, petroleum, electricity, etc.,) that go into the manufacture of fertilizers and pesticides. This fact does not necessarily mean that the consumption of these chemical inputs is insignificant. For the most part, they represent non-renewable energy resources.

For example, it is estimated that 38,000 cubic feet of natural gas are required to produce one ton of nitrogen fertilizer (Lockeretz 1977). If the proposed action consumed an average of 121 pounds of nitrogen per acre (see Table 2-23, Chapter 2, and the assumed crop rotation), this would amount to 6,380 tons per year, or 242 million cubic feet of natural gas per year.

It has been assumed, so far, that electricity would be the energy form used in pumping water for the proposed action. It is possible, however, that at some point in the future diesel and/or natural gas would become competitive with electricity for irrigation. If diesel or natural gas were used instead of electricity for irrigating the proposed action, there would possibly be a significant effect on the supply and cost of these two commodities. As a rough estimate, the proposed action would require 9.2 million gallons of diesel per year, or 3 percent of the total Idaho consumption; alternatively, it would require 12.8 million therms of natural gas, or about 3.4 percent on Intermountain Gas Company's 1977 sales.

On-Farm Energy Use

In order to calculate total on-farm energy use for a typical farm in the proposed action, chemical and electrical energy consumption must be combined. Based on the chemical inputs for each crop shown in Table 2-23, Chapter 2, the per-acre chemical inputs for the assumed five-crop rotation (combining barley and winter wheat as one crop) could be calculated. These values are then converted into BTUs and added up to give a total of 8,542 thousand BTU of chemical energy per acre as shown in Table 3-25.

Table 3-26 shows the total chemical and electrical energy input per acre for land located at various distances from and heights above the river. Table 3-27 shows the yearly energy consumption in million BTUs by a 320 acre farm at the various lift heights. For each lift height, the distance shown is the most typical (median) distance associated with that lift height. The 650 foot lift and 6-8 mile distance combination is the median for all acres irrigated out of the river. The 650 foot, 4-6 mile combination is included because it represents the median lift height and distance for proposed action areas, including well-irrigated acres.

The value used in Table 3-26 for converting KWH of electrical energy into BTUs (11,475 BTUs per KWH) is based on the "most probable" assumption that the electricity to supply the proposed action would come from coal fired power plants. This BTU value, therefore, is the energy value of the coal that must be burned to generate the required KWHs, including extra KWHs to cover line losses. Finally, to determine direct energy consumption the electrical input values were added to the average chemical input value of 8,542,000 BTUs per acre from Table 3-25.

In addition to direct energy consumption electricity for pumping and chemical applications the hydroelectric losses due to diversions should be considered in calculating the total energy consumption of a typical acre or typical farm in the proposed action.

Table 3-25

CHEMICAL ENERGY CONSUMPTION FOR FIVE CROP ROTATION

Table 3-24

CHEMICAL ENERGY CONSUMPTION FOR FIVE CROP ROTATION

ANNUAL PROPOSED ACTION CONSUMPTION OF CHEMICAL ENERGY FORMS			Proposed Action Consumption As Percent Of Idaho Consumption	Application (gal/acre)	Thou BTU/Acre
Proposed Action Consumption	Current Idaho Consumption*				
Gasoline (thou gal)	1,012	521,000	.2%	9.4	1167
Diesel (thou gal)	2,175	316,000	.7%	20.2	2797
Fertilizer (tons)	12,061	565,793	2.1%		3964
Pesticides (tons)	201	3,067**	6.5%		
Total Fuel					
Nitrogen				(lbs/acre)	
Phosphate				121	3763
Potassium				68	379
Total Fertilizer				<u>35</u> <u>224</u>	150
Total Chemical Energy/Acre					4292
Insecticide				(lbs/acre)	
Herbicide				.71	83
Total Pesticide				<u>3.03</u> <u>3.74</u>	203
Total Chemical Energy/Acre					286
Total Chemical Energy/Acre					8542

SOURCE: Integrated Energy Systems, Inc. - Boise, Idaho
(Contract No. YA-512-CT8-226)

* From Chapter 2, Existing Chemical Environment
** Agricultural Consumption only

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract
No. YA-512-CT8-226).

The total net hydro loss due to the proposed action in an average year is the sum of the net losses in the IPC system and the net losses on the FCRPS system, or 304,277 MWH. This figure is then divided by 111,015 acres to get an average per-acre hydro loss of 2741 KWH per year. Assuming that this lost hydroelectricity must be replaced with electricity from a coal-burning plant, the conversion factor of 10,500 BTU per KWH is applied, giving a per-acre indirect consumption of 28.8 million BTUs. (Line losses are not included here since the hydroelectricity not generated is an at-the-plant, not a delivered, loss.) Adding this indirect consumption to the direct consumption gives the total energy consumption of a typical acre and typical 320 acre farm as shown in the last columns of Table 3-26 and 3-27.

Input/Output Analysis

The relative amount of energy required to grow a certain crop can be compared with the energy value (in calories or BTUs) of that crop. Table 3-28 shows the energy output of each crop in the assumed rotation given typical yields and nutritional values in kilo-calories (KCAL) per pound.

Though energy values of crops are based on nutritional values, these net energy values do not include any processing, transportation, or any other steps between the crop "in the ground" on the proposed action and actual human consumption. With the exception of potatoes and dry beans, which in theory require only cooking before human consumption, all the other crops are not in a form that is normally consumed by humans without further processing. In addition, a substantial portion of the potatoes and beans may undergo further processing.

In addition to the electrical and chemical energy inputs described in the previous section, the input/output analysis will include input value for the energy embodied in the irrigation system itself. Assuming two quarter-mile wheel lines for each 40 acre parcel, there are approximately 78 pounds of aluminum per acre. About 16 KWH (Hagan, April 1978) of energy is required to produce one pound of finished aluminum pipe. Aluminum energy input is therefore 1250 KWH per acre. If this is divided by an assumed life expectancy of 15 years for the pipe, the annual energy requirement is 83 KWH per acre per year. Applying a thermal value to this of 10,500 BTU per KWH, this amounts to .87 million BTU per acre per year.

Table 3-29 shows the total electrical energy (direct and indirect), total chemical energy (calculated from Table 2-23, Chapter 2), and the sum of these inputs for each crop for a "typical" acre in the proposed action. The "typical" acre is in the median category for both lift height and distance (650 feet, 4-6 miles from the river) for all acres, including those irrigated from wells. Table 2-29 compares total inputs with the BTU value for the energy output of each crop, from Table 2-28 and shows the net energy yield for each crop along with the ratio of input to output.

Table 3-26

TOTAL PER ACRE ENERGY CONSUMPTION

LIFT	MILES	DIRECT CONSUMPTION		DIRECT + INDIRECT CONSUMPTION Total Energy Million BTU's
		Electricity Million KWH	Total Energy Million BTU's	
150'	0-2	1272	23.1	51.9
250'	0-2	1605	26.9	55.7
350'	2-4	2208	33.8	62.6
450'	2-4	2538	37.6	66.4
550'	2-4	2869	41.4	70.2
650'	* 4-6	3478	48.4	77.2
650'	6-8	3757	51.6	80.4
750'	8-10	4367	58.6	87.4

* Median lift height and distance

SOURCE: Integrated Energy Systems, Inc. Boise, Idaho
(Contract No. YA-512-CT8-226)

Table 3-27

ENERGY CONSUMPTION FOR A 320 ACRE FARM

(Billion BTU's)

LIFT	MILES	DIRECT ENERGY	DIRECT PLUS INDIRECT ENERGY
150'	0-2	7.4	16.6
250'	0-2	8.6	17.8
350'	2-4	10.8	20.3
450'	2-4	12.0	21.2
550'	2-4	13.2	22.4
650'	* 4-6	15.5	24.7
650'	6-8	16.5	25.7
750'	8-10	17.9	28.0

* Median lift height and distance

SOURCE: Integrated Energy Systems, Inc. - Boise, Idaho
(Contract No. YA-512-CT8-226)

TABLE 3-28
ENERGY OUTPUT OF CROPS

CROP	KCAL/LB	YIELD/ACRE (LBS)	MILLION KCAL/ACRE	MILLION BTU/ACRE
Potatoes	345	51,500	10.87	43.1
Grain	1750	4,500	7.88	31.2
Sugar Beets	262	40,000	10.48	41.6
Beans	1566	1,875	2.94	11.7
Alfalfa	221	7,100	1.57	6.2

Sources: KCAL/LB: Food Values of Portions Commonly Used, Bowes and Church, 1970. "Composition of Cereal Grains and Forage", National Research Council, Washington National Academy of Sciences, 1958. Personal communication, Amalgamated Sugar Company.
Yields: IDWR

Conversion Factor: .252 KCAL/BTU

Table 3-29
INPUT/OUTPUT ANALYSIS FOR FIVE CROPS
PROPOSED ACTION "TYPICAL"^a ACRE

	MILLION BTU's/ACRE			INPUT/OUTPUT
	INPUT	OUTPUT	NET YIELD	
Potatoes	Chemical 18.7 Elec-trical ^c 77.4 Total 96.1	43.1	-53.0	2.2
Grain	3.8	31.2	-33.4	2.1
Sugar Beets	10.3	41.6	-49.9	2.2
Beans	7.0	11.7	-58.2	6.0
Alfalfa	1.6	86.8	-80.6	14.0

^aThe median lift and distance for the proposed action acreage including wells is used to define typical. This is 600-700 feet lift and 4-6 miles from water source.

^bCalculated from Table 5, Chapter 2, using the following conversion factors: gasoline - 124,240 BTU/gal; diesel - 138,690 BTU/gal (Idaho Office of Energy) - Nitrogen - 31,097 BTU/bl.; Phosphorus - 5,561 BTU/lb.; Potassium - 4,279 BTU/lb.; Insecticide - 116,892 BTU/gal; Herbicide - 67,153 BTU/gal. (Federal Energy Administration)

^cDirect consumption, based on the individual water requirements for each crop plus 28.8 million BTU for average per acre hydro losses, plus .9 million BTU for per acre embodied energy in aluminum pipe.

SOURCE: Integrated Energy Systems, Inc. - Boise, Idaho
(Contract No. YA-512-CT8-226)

The net energy yield, as shown in Table 3-29, is negative for all crops, with alfalfa as the least and grain as the most energy efficient. The same analysis performed for the lowest lift and distance (150 feet and 0 to 2 miles) also gives negative yields in all cases.

An input/output analysis of this sort has its limitations. For example, by converting all energy forms to one common unit (BTUs), a common value or usefulness is implied for all energy. In fact, some forms of energy may be more useful or more scarce than other forms, e.g., food is more important from the standpoint of feeding people than gasoline; natural gas may be more important from the standpoint of diminishing non-renewable resources than coal.

Impact Summary

The primary energy impacts would result from the cost to IPC customers of additional electricity resources to meet proposed action irrigation pumping demand. Electricity consumption of the proposed action was estimated for two cases, an "average" case designed to simulate average weather conditions and irrigation requirements and a "worst case" designed to simulate drought weather conditions and irrigation requirements.

In the "average" case the proposed action direct electricity consumption was estimated at 373,830 MWH per season. The typical (median lift height is 650' and 4-6 miles distance from the river) acre would require 3,478 KWH per season. In the "worst case" direct consumption was estimated at 525,154 MWH per season for the proposed action and 4,736 KWH per season for the "typical" acre.

Irrigation diversions from the Snake River result in losses of hydroelectric generation at downstream dams on the IPC system. The total load on the IPC system that would be created by the proposed action, including downstream hydroelectric losses, was estimated at 569,288 MWH in the "average" year. The highest monthly load would be in July, with 207.7 average MW. "Worst case" total load was estimated at 788,412 MWH, with a monthly high in June of 269.9 average MW.

The load of the proposed action cannot be met from existing IPC owned generating resources. Existing IPC contracts for purchase and exchange of power expire before the proposed action would be implemented.

Calculations of cost impacts were based on "average year" consumption only. If electricity supplies were obtained to meet "worst case" loads, the cost impact would be greater. Three alternative sources of electricity supply to meet the proposed action load demand are analyzed. The most likely potential sources were determined to be either IPC construction of 260 MW of thermal generating capacity (with export of power during non-irrigation months) or seasonal IPC participation in a thermal plant constructed by another utility. In the first case the annual cost of the new supply in 1977 dollars would be \$65.1 million, in the second case, \$22.8 million. Assuming the current electricity rate system, of this total annual cost the proposed action irrigators would pay \$8.1

million of this total annual cost in the first case or \$6.5 million in the second case leaving \$48.6 million or \$16.3 million per year to be borne by other IPC ratepayers. On a per-acre basis this would be a subsidy paid by IPC ratepayers of \$438 per acre per season in the first supply case, or \$147 per acre per season in the second supply case.

The major energy impact of the proposed action would be the effect of increased electricity costs on existing IPC customers. The addition of the proposed action load on the current IPC system would result in the following estimated increases in annual electric bills (with no factor for future inflation) for typical (average use) IPC customers:

\$/Year	Residential	Small Commercial (Sch 12)	Large Commercial (Sch 19)	Irr (100HP)
Case 1 IPC adds 260 MW capacity	\$93	\$699	\$44,431	\$852
Case 2 IPC participation with another utility	\$30	\$220	\$14,202	\$279

Impacts on residences depend on the portion of income spent on electric bills. For low income households, especially those with electric heat, the impacts could be severe.

Impacts on commercial, industrial, and irrigation pumpers depend on the portion of operating or production costs that go to electric bills.

The implications of high electricity prices to existing irrigation pumpers are especially important. The combination of higher electricity prices and increased competition from proposed action production has the potential for driving existing land out of production.

The result of implementing the proposed action would be a large increase in agricultural electricity consumption. However, the overall gain in agricultural production would depend on the extent of which existing farms (and even the proposed action itself) could weather the economic pressures caused by higher electricity costs which would result, in part, by proposed action electricity demand.

In addition to impacts on the IPC system, the irrigation diversions of the proposed action would result in losses of hydroelectric generation at federal dams on the Snake Columbia system. These losses would be 154,799 MWH 214,879 MWH over the irrigation season in the "average" or "worst case" years, respectively. Replacement of these losses would cost \$5.2 (average) or \$7.3 (worst case) million per year.

The direct energy consumption of gasoline and diesel plus indirect consumption represented by fertilizers, pesticides, herbicides, and the embodied energy of irrigation systems by the proposed action was estimated. The chemical energy consumption of the proposed action would not have a measurable impact on the supply or cost of these chemical energy forms. These energy forms are, however, generally non-renewable resources.

CHAPTER 4

MITIGATION MEASURES NOT INCLUDED IN THE PROPOSED ACTION

Chapter 4 discusses measures that would be used to reduce or eliminate certain adverse impacts from the proposed farm development.

CHAPTER 4 MITIGATION MEASURES

The Bureau of Land Management would carry out the following measures if the proposed action were to be implemented. These measures are designed to reduce certain environmental impacts identified in Chapter 3. However, only a small portion of adverse impacts identified can be reduced by application of measures mentioned in this section. All these measures would prevent farming in certain locations in the ES area. The mitigating measures are organized by environmental components and apply to both Desert Land Act (DLA) and Carey Act (CA) methods of land transfer.

WILDLIFE

1. Measure

To protect valuable existing wildlife habitat, no farm development would be allowed across or immediately adjacent to a permanent stream body or established riparian habitat. A buffer strip of public land at least 100 feet each side of such habitat would be preserved in its native condition for wildlife benefits.

Effectiveness

This measure would protect all existing riparian habitats before farm projects were developed. It would provide a narrow buffer strip between the edge of agriculture fields and the riparian zone.

2. Measure

Buffer areas of existing native vegetation would be retained between large agriculture projects and adjacent to unique features, such as the Snake River canyon. These buffer areas would need to be interconnected and large enough to support viable populations of raptor prey species as determined by the BIM, Idaho Fish and Game Department, and U.S. Fish and Wildlife Service.

Effectiveness

The effectiveness of this mitigation is difficult to assess. Only limited populations would be retained as the buffer areas would be limited in size. An estimate would be that the percent of habitat retained equals the percent of wildlife species retained.

3. Measure

Surveys will be done prior to approval of proposed farm projects to determine effects on sensitive wildlife species in the area. This is in keeping with the 1977 Memorandum of Understanding between the BLM and Idaho Department of Fish and Game, previously discussed in Chapter 2. The principal sensitive wildlife species found in the ES area are the ferruginous hawk, western burrowing owl and long-billed curlew. Those proposed land alterations which would significantly impact sensitive species populations would not be allowed.

Effectiveness

The actual effectiveness of this mitigative effort will not result in 100 percent sensitive species retention. The size of the significant habitat areas needed to be retained will be difficult to determine. For example, raptor nesting sites will need adequate foraging areas nearby. The size of the foraging areas will be dependent upon many factors that cannot be precisely defined. Therefore, the effort to protect adequate habitat will not always be completely effective and would differ based on the species involved. For example, it might be possible to save 90 percent of curlew or burrowing owl habitat and only 50 percent of a ferruginous hawk habitat.

CULTURAL RESOURCE

4. Measure

Remnants of the Oregon Trail and Kelton Road will be protected. A buffer strip of public land would be established along the Oregon Trail, its alternate routes, and the Kelton Road, with no farm development being allowed within the corridor. The width of the corridor would vary, but would be based on preserving aesthetic, visual and historic qualities along these trails. The Advisory Council would be consulted as outlined in Chapter 1 when National Register eligible segments of these routes are involved.

Effectiveness

This would preserve about 18 miles of natural landscape along the Oregon Trail and Kelton Road corridors. It would totally eliminate destruction of trail remnants from farm expansion and maintain these trails for cultural interpretation and public enjoyment.

5. Measure

No agricultural development or irrigation facility rights-of-way would be allowed in the 3,875 acre designated Hagerman Fauna Sites National Natural Landmark.

Effectiveness

This measure would fully eliminate the impact of farming on 160 acres (as designated under the proposed action) within the Hagerman Fauna sites, plus prevent future disturbance by construction of irrigation penstocks across the area. Paleontological values would be preserved.

RECREATION

6. Measure

Farm development would not be allowed within 1/4 mile of Foreman and Morrow Reservoirs to assure public recreation access to, and use adjacent to these waters.

Effectiveness

This measure would essentially maintain present public use and access to these waters.

7. Measure

The same as 4 and 5 above.

Effectiveness

These measures would maintain the integrity of valuable cultural resources for public viewing and historic appreciation.

VISUAL RESOURCES

8. Measure

The same as measures 4 and 5 above.

Effectiveness

These two measures would address the Oregon Trail, Kelton Road and the Hagerman Fauna Sites National Natural Landmark which are under Visual Resource Management (VRM) Class I designation. VRM Class I applies to special areas having unique features, where it is important to preserve the existing landscape integrity. Measures 4 and 5 would assure that the existing landscape character would not be changed under proposed action farm development.

CHAPTER 5

UNAVOIDABLE ADVERSE IMPACTS

Chapter 5 describes the adverse impacts likely to remain after application of the mitigating measures discussed in the preceding chapter.

CHAPTER 5 UNAVOIDABLE ADVERSE IMPACTS

AIR QUALITY

The proposed action would lower air quality by causing particulate concentrations to increase especially, during spring months when wind velocities are highest and fields are often bare of crop cover. Annual secondary, primary and 24-hour air quality standards would be exceeded during March, April and May. Dust storms would occasionally develop, affecting the communities of Hammett, Hagerman, Bruneau, Buhl, Glenns Ferry and Twin Falls. In some instances, hazardous driving conditions would result from near zero visibility. In accordance with Idaho Department of Health and Welfare findings, the average annual increase in particulate pollution due to new agricultural development would probably not exceed more than 10 micrograms per cubic meter.

SOILS

Soil erosion from sprinkler irrigation is estimated to be slight, at less than two tons per acre in most areas, due to efficient irrigation water application. Wind erosion during spring months could be significant where fields lie fallow and soil moisture is low, varying from 0-15 tons per acre. Soil erosion from high winds would be slight where soil moisture was high, where an over wintering cover crop such as alfalfa was established, or grain stubble material was present. Crop rotations and farming practices would most influence wind soil losses.

WATER RESOURCES

Uses and Flows

The proposed action would pump 250,004 acre-feet of water from the Snake River and 27,823 acre-feet from ground water sources between Bruneau and Murphy. River flow at Murphy would be reduced by 975 CFS during peak pumping periods. This would not threaten existing municipal, industrial, domestic or agricultural water rights for Snake River water but would adversely impact farmers presently using ground water by lowering water tables between Bruneau and Murphy. The extent of this impact is unknown.

The Snake River flows would remain above the Idaho legislated 3,300 CFS maintenance flow at the Murphy gage during normal years, but would drop as much as 22 percent below the Idaho Fish and Game recommended wildlife maintenance flow of 5500 CFS during low water years (such as 1977) at the Murphy gage.

Irrigation withdrawals for the proposed action would result in losses of hydroelectric generation at downstream dams on the Snake River Idaho Power Company system. This is estimated at 161,731 MWH during an average flow year and 214,506 MWH during a 1977 low flow year (these losses are during the irrigation season only).

Water Quality

There will be occasional accidents or storms which cause brief overland water flow, leading to movement of sediment and adsorbed fertilizer residues and toxicants to tributaries and the main river. Nitrate would increase slightly, especially above Strike pool, from irrigation returns via infiltration and tributaries. Water quality in tributaries would decline moderately as silts and nitrate-rich water from infiltrated irrigation applications enters. Winds will carry soil particles with adsorbed fertilizer residues and toxicants to tributaries and the main river. The extent of this movement is not predictable.

In low flow years, water temperatures would increase slightly in the ES area, especially in the area above Swan Falls pool in July and August as a result of shoaling - the reduction of water depth with moderate change in wetted perimeter.

In low flow years, sedimentation would increase slightly above Strike pool, as reduced flows there permit earlier settling of suspended sediments.

Groundwater quality will decline slightly because of percolation into the higher water tables.

VEGETATION

Terrestrial

Approximately 107,685 acres of shrub and grass range vegetation (including 33,090 acres of seeded grassland) would be cleared and replaced by agricultural crops. Up to 22,230 acres would be cleared in addition for non-crop land uses in support of farm development. This extensive vegetation change would in turn adversely impact other resources such as wildlife and livestock grazing.

Aquatic

Only in extreme low flow years would there be moderate increases in phytoplankton within the ES area segment of the Snake River. In all years, phytoplankton blooms would last slightly longer. Increases in phytoplankton would tend to increase turbidities and BOD downstream.

WILDLIFE

Terrestrial

Habitat destruction is the most significant adverse wildlife impact which would result from the proposed action. Habitat loss would affect all native wildlife which use the 61,715 acres of shrub/grassland or 49,300 acres of grassland habitat types that would be converted by the proposed action. Nine percent of the mule deer winter range would be lost, and an estimated 40 to 60 deer (or 8 to 12 percent of the deer using this area within the ES boundaries) would be displaced or lost. Other mammals significantly impacted by habitat loss include pygmy rabbits, black-tailed jackrabbits, and various rodents. These mammals are an important food source to many predators.

Land conversion resulting in habitat loss for black-tailed jack-rabbits, various rodents, birds, and reptiles would be an important secondary adverse impact to birds of prey. This would result in a significant reduction of raptor food sources. This would cause population decreases for all raptor species in the ES area.

Birds which are dependent upon the shrub/grassland habitat type during their reproductive period would show population declines throughout the ES area due to habitat destruction. These birds include: the sage sparrow, sage thrasher, vesper sparrow, black-throated sparrow, lark sparrow, and the sage grouse. The sage grouse would suffer the loss of one strutting ground and 1,000 acres of wintering habitat, resulting in a loss of 20-50 birds. In addition, three other strutting grounds are located close to the proposed agricultural development. Sage grouse numbers on these grounds would be reduced.

Waterfowl using islands in the Snake River may suffer increased nest predation and disturbance due to lower flows which could create land bridges between islands and the mainland. As a result, decreased waterfowl production in these areas could be expected.

The sensitive species survey mitigation discussed in Chapter 4 would only be partially effective. Sensitive species impacted by the proposed action are the ferruginous hawk, long-billed curlew, and the burrowing owl. Population declines of these animals would be expected. Since there is a great deal of difficulty in determining their spacial requirement or foraging area, nesting sites would be located and protected but some feeding ranges could not be saved.

Increased human disturbance to wildlife due to farming activity constitutes another significant, unavoidable adverse impact, particularly during reproduction periods. This impact would displace and cause additional stress to wildlife, resulting in decreased production and survival.

Fisheries

Significant adverse impacts upon fisheries would occur during low flow years. During these low water years mortality of larvae of embryos of edge spawners (channel catfish, smallmouth bass, and black crappie) would increase sharply. Reduced survival of edge spawners would eventually lead to a slight shift of the fish species mix toward channel spawners. Fish biomass in the ES area would move toward squawfish, suckers, shiners, and in a few locations, trout. Overall losses in game fish stocks would amount to 5-25 percent.

There would be the moderate decline in growth and moderate increases in mortality of white sturgeon along with other game fish in a low flow year due to predation. This would lead eventually to moderate declines in sturgeon abundance. These declines will take some time because sturgeon stocks consist of 50-70 year age classes.

With the exception of sturgeon, most game fish stocks in the ES area have 5 to 6 year classes in the population (although a few older fish will always be present). Thus, if two low flow years were to occur within 5 years, one-third of an edge-spawning population would be impacted by reductions in reproductive success and growth. Sturgeon stocks consist of many age classes, hence the impact of two low flow years in a short period does not immediately alter their total numbers. Eventually, reduced growth and survival of sturgeon will lead to moderate declines in abundance.

Average flow years would only slightly impact fisheries in the ES area. Slight increases in mortality of larval white sturgeon, channel catfish, smallmouth bass, and black crappie in the Snake River ES area would occur. Growth of these same species would decline slightly. Total abundance would decline slightly to moderately.

Even with settling ponds, occasional overland flows of water will occur from very intense summer storms or broken canals or pipes. These flows will occasionally carry toxic materials to the river, and localized fish kills of unpredictable severity will occur. Winds will also carry toxic materials (bound to soil particles) to the river with the same effects.

As part of the cumulative effect of Columbia Basin water withdrawals, reduced flows in the Snake River would slightly reduce habitat quality for anadromous and resident fishes below the ES area.

If the proposed action is taken, it will contribute to the demand for more electrical energy. In meeting that demand, construction of additional hydropower or thermal generation stations would eliminate habitat for sturgeon and other game fishes in the Snake River ES area. Hydropower stations physically eliminate running-water habitat. Thermal plants usually use river water for cooling. More importantly, the use of rivers for energy production leads to increased use of hydropower dams for peaking. This leads to substantial water fluctuations, with accompanying deterioration of fishery habitat.

Unknown quantities of Snake River fishes will be entrained in pump intakes and lost to the system. These may include preferred game fishes.

CULTURAL RESOURCES

The effectiveness of mitigation procedures described in Chapter 1 and Chapter 3 would determine the extent of unavoidable adverse impacts to cultural resources. Scientific information would be lost in certain less than ideal situations as described in Chapter 3. In addition, the process of salvage excavation itself is destructive and the site in question is gone forever once excavated. The degree of effectiveness of mitigation cannot be predicted in the absence of complete inventory information.

VISUAL RESOURCES

Since most of the farm and associated development would occur on VRM Class IV areas (low scenic quality), modification of the natural

landscape in these Class IV areas would be considered acceptable by some people. However, several road and transmission line crossings of the Oregon Trail and Kelton Road (VRM Class I) would be necessary to facilitate farming activity. These developments would result in adverse visual impacts on these historic routes. The impact would be especially severe on the Oregon National Historic Trail.

The Snake River Canyon from Hammett east to Salmon Falls Creek is designated as a BLM VRM Class II area. Even after proper location, facility design, and site rehabilitation and landscaping, the development of irrigation pump stations and associated roads, transmission lines, and penstocks would result in visual intrusions which may exceed the BLM's visual resource contrast rating for these areas. In VRM Class II areas, any changes in the basic elements of the natural landscape should not be evident and should not attract attention. Highest visual impacts would occur where the Snake River is visible to passing motorists on Highway 30 and Interstate 80.

There would also be an unavoidable adverse visual impact resulting from concentrated ORV activities. This is especially true on smaller parcels of public land with steeper topography that are retained within the farm areas and accessible from farm access roads. Since this use would occur mostly on Visual Resource Management Class IV areas, the impact would not be severe.

RECREATION

During low-water years, such as 1977, the quality of water based recreational opportunities along the Snake River would be lowered. Snake River volumes would be reduced about 975 CFS in July at the Murphy river gage.

Sight-seeing use along the Snake River would also be impacted by the construction of pumping facilities along the river. These visual intrusions would have the most impact on sight-seeing opportunities if located in areas visible from Interstate 80 and Highway 30.

Road, canal and transmission line crossings of the Oregon Trail and Kelton Road routes would reduce the recreational value of these historic locations. The greatest impact would be on the Oregon Trail. It is included in the National Trails System and has the potential to attract significant recreational use once it is identified and interpreted for public enjoyment.

About 60,400 acres of public land currently used by ORV recreationists would be taken away by the proposed action. This would force increased ORV use on other ORV areas and put more pressure on remaining public land near the ES area.

LIVESTOCK GRAZING

With implementation of the proposed action, livestock grazing would be eliminated on approximately 146,380 acres of public land within the

ES area. One hundred twenty seven operators in 24 allotments would lose a total of approximately 14,975 AUMs of grazing use per year. With this situation, approximately 42 operators would lose more than 20 percent of their operation in the BLM Boise District; approximately 13 would lose 11-20 percent; and approximately 72 would lose 0-10 percent. Furthermore, the scattered farm location would make it unfeasible for many operators to continue grazing livestock on the public land remaining amidst the farms, and in some allotments, effective grazing use could no longer be made within the ES area. Therefore, as much as 41,397 AUMs per year could actually be lost rather than 14,975 AUMs.

MINERALS

Approximately 1.3 million cubic yards of gravel material would be needed for new access road construction when farmland is developed under the proposed action. This would disturb between 200 and 300 acres. (Assuming a gravel deposit two yards deep).

TRANSPORTATION

About 300 miles of new gravel roads would be needed to provide access in new farm project areas. In most instances these roads would be constructed by farm developers in accordance with county road standards, and then dedicated to the counties for maintenance and upkeep.

ECONOMIC

Of the 15 combinations of crop and energy prices depicted in Chapter 3, Table 3-8, only two showed a net farm profit above the poverty level for a farm family. Therefore, it is assumed that in 13 cases, all economic sectors would be impacted adversely.

Socio-economic impacts were analyzed for the most favorable crop and energy conditions (1976 Normalized and 16.5 mills per KWH). Under this situation the following impacts would result:

Carey Act

There would be an increase of 308 school children needing 13 new teachers; increased population would require 13 additional health care personnel and 8 additional firemen and policemen; the cost of required public facilities could be as much as \$1.6 million and the total public capital cost could reach \$3.1 million.

Desert Land Act

There would be 173 more school children which would require 8 new teachers; increased population would require 8 additional health care personnel and 5 additional firemen and policemen; cost of required public facilities could be as much as \$985,500 and the total public capital costs could reach \$1.7 million.

Under both authorities local livestock ranchers would lose a total of up to 38,025 AUMs of active grazing use per year on public land, worth approximately \$414,000 in direct annual income.

ENERGY

Electricity consumption of the proposed action was estimated for two cases. An "average" case designed to simulate average weather conditions and irrigation requirements and a "worst case" designed to simulate drought weather conditions and irrigation requirements.

In the "average" case the direct proposed action electricity consumption was estimated at 373,830 MWH per season. The typical (median lift height is 650 feet and 4-6 miles distance from the river) acre would require 3,478 KWH per season. In the "worst case" direct consumption was estimated at 525,154 MWH per season for the proposed action and 4,736 KWH per season for the "typical user."

Irrigation diversions from the Snake River result in losses of hydroelectric generation at downstream dams on the IPC system. The total load on the IPC system that would be created by the proposed action, including downstream hydroelectric losses, was estimated at 569,288 MWH in the "average" year. The highest monthly load would be in July, with 207.7 average MW. "Worst case" total load was estimated at 788,412 MWH, with a monthly high in June of 269.9 average MWH.

The load caused by the proposed action cannot be met from existing IPC owned generating resources. Existing IPC contracts for purchase and exchange of power expire before the proposed action would be implemented.

Calculations of cost impacts were based on "average year" consumption only. If electricity supplies were obtained to meet "worst case" loads, the cost impact would be greater. Three alternative sources of electricity supply to meet the proposed action load demand were analyzed. The most likely potential sources were determined to be either IPC construction of 260 MW of thermal generating capacity (with export of power during non-irrigation months) or seasonal IPC participation in a thermal plant constructed by another utility. In the first case the annual cost of the new supply in 1977 dollars would be \$65.1 million; in the second case, \$22.8 million. Assuming the current electricity rate system of this total annual cost the proposed action irrigators would pay \$8.1 million of this total annual cost in the first case, or \$6.5 million in the second case. This leaves \$48.6 million or \$16.3 million per year to be borne by other IPC ratepayers. On a per acre basis, this would be a subsidy paid by IPC ratepayers of \$438 per acre per season in the first supply case, or \$147 per acre per season in the second supply case.

The major energy impact of the proposed action would be the effect of increased electricity costs on existing IPC customers. The addition of the proposed action load on the current IPC system would result in the following estimated increases in annual electric bills (with no factor for future inflation) for typical (average use) IPC customers:

<u>\$/Year</u>	<u>Residential</u>	<u>Small Commercial (Sch 12)</u>	<u>Large Commercial (Sch 19)</u>	<u>Irr (100HP)</u>
Case I, IPC adds 260 MW capacity	\$93	\$699	\$44,431	\$852
Case 2, IPC participation with another utility	\$30	\$220	\$14,202	\$279

Impacts on residences depend on the portion of income spent on electric bills. For low income households, especially those with electric heat, the impacts could be severe.

Impacts on commercial, industrial, and irrigation pumpers depend on the portion of operating or production costs that go to electric bills.

The implications of high electricity prices to existing irrigation pumpers are especially important. The combination of higher electricity prices and increased competition from proposed action production has the potential for driving existing land out of production.

The result of implementing the proposed action would be a large increase in agricultural electricity consumption. However, the overall gain in agricultural production would depend on the extent of which existing farms (and even the proposed action itself) could weather the economic pressures caused by higher electricity costs which would result, in part, by proposed action electricity demand.

In addition to impacts on the IPC system, the irrigation diversions of the proposed action would result in losses of hydroelectric generation at federal dams on the Snake/Columbia system. These losses would be 154,799 MWH or 214,879 MWH over the irrigation season in the "average" or "worst case" years, respectively. Replacement of these losses would cost \$5.2 or \$7.3 million per year.

The direct energy consumption of gasoline and diesel plus indirect consumption represented by fertilizers, pesticides, herbicides, and the embodied energy of irrigation systems by the proposed action was estimated. The chemical energy consumption of the proposed action would not have a measurable impact on the supply or cost of these chemical energy forms. These energy forms are, however, generally non-renewable resources.

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL SHORT TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

Chapter 6 provides a long-range perspective of the possible effects the proposed farm development would have on the overall environmental production of the area. It compares tradeoffs between the short-term uses of the environment to the long-term impairment or enhancement of the overall resource productivity.

CHAPTER 6

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

For the purposes of this analysis, short-term is defined as the period from 1980 through 1994 during which time the land would be "opened" for farming, plus that amount of time that would be required to bring the land into full crop production. Generally speaking, land would be converted within the three to ten year time frames allowed under DLA and CA authorities. Thus, public land opened for farming in 1984 should be fully developed and patented by 1994. Therefore, the short-term will be considered between 1980 and 1994 and long-term will be any time after 1994.

AIR QUALITY

There will be both a short-term and long-term lowering of air quality, principally during windy periods in the spring months. Pollutants would be mainly in the form of airborne dust particles. The average annual increase in particulate pollution due to new agriculture development would not exceed more than 10 micrograms per cubic meter. Additional pollutants from agriculture-related commercial and industrial facilities would eventually occur, adding somewhat to the long-term decline in air quality.

SOILS

In the short-term, natural soils productivity would decline while farmers are attempting to reclaim their investments by continuously planting high-value cash crops. This would deplete organic matter content, deplete the surface horizon, and reduce fertility.

In the long-term, soil productivity would be regained but probably would not reach original levels. As investments are regained, farmers would generally develop crop rotation systems, use continuous pasture in eroding areas, implement soil conservation practices, and place more natural nutrients back into the soil. With such management, the soils would be improved by increasing organic matter content and fertility while improving the soil structure. Some farmers, however, would continue to seek high cash returns at the expense of soil fertility, and thus cause continual depletion. On some soils there may be a problem with salt build-up which would decrease long-term productivity.

WATER RESOURCES

Irrigation of farmland creates a long-term demand for water. The 277,827 acre feet of water needed per year for the proposed development would be lost to any other present or future uses. The cumulative effect of this withdrawal plus future upstream withdrawals for other projects would lead to a gradual depletion of the areas water resources. Continued withdrawal of Snake River water would reduce long-term productivity of water based recreation opportunities and aquatic wildlife populations. Future options for water use would be gradually, and perhaps irrevocably, foreclosed. Water, a limited resource, would become more limited.

Surface water quality may increase slightly in the short-term and long-term. There could be a long-term improvement of water quality in the Snake River as state water quality goals are achieved.

It is expected there would be both a short-term and long-term degradation of groundwater quality. Groundwater productivity would decrease in the sense that 1.) the quality of the water would interfere with its potential use, and 2.) water would be extracted from the aquifer faster than it would be replaced.

VEGETATION

Under the proposed action, up to 130,015 acres of rangeland vegetation would be lost. This long-term loss will be accompanied by a long-term gain of about 107,685 acres of high producing farmland. In terms of vegetation production, native vegetation currently produces about 500 to 700 lbs./acre (loss); irrigated agriculture will produce an average of 8600 lbs./acre (gain). This gain is over 14 times (1,433 percent) greater than the loss. Most of the production from the agricultural land will be directly consumed by humans, whereas none of the native vegetation production is directly consumable by humans.

The short-term and long-term loss of 130,015 acres of rangeland vegetation represents about 4 percent of the 3.3 million acres of this vegetation type that currently exists in the State (Idaho Almanac, 1977). The gain of 107,685 acres of new irrigated farmland is 2.8 percent of the 3.9 million acres now under irrigation in the State.

Since the reason for the proposed action is to produce food for human consumption, additional vegetative production may also be viewed as an increase in human productivity. The crops grown would contribute to social well-being and stimulation of the local economy in the long-term. Further discussion of human productivity is found in the socio-economic section.

WILDLIFE

From a total wildlife numbers standpoint, it is expected the proposed action will cause a short-term loss. In the long-term, however, total numbers should remain about the same as exist now, or may increase slightly. Short-term reductions will be caused by loss of habitat for nearly all species that now exist in the study area. As agricultural development proceeds, new habitat will be created and this habitat will serve different wildlife populations - some old and some new. If the proposed action is accomplished as planned, many of the "new" populations (pheasants) will have a higher public value than those populations that were lost (rabbits).

From a species survival standpoint, several species will be subject to long-term, adverse impacts. The long-billed curlew, burrowing owl, and ferruginous hawk will incur habitat and prey losses that will make their survival in the area questionable. Since their survival, as a species, is in jeopardy in Idaho, the proposed action must be considered, in the long-term, as a threat to the survival of these species.

Because of water withdrawals from the Snake River, there would be a 5 to 25 percent long-term decrease in game-fish production in the river. Cumulative impacts from other types of future withdrawals would further reduce game-fish production. Non-game fishes would increase.

CULTURAL RESOURCES

Because cultural sites represent a finite resource which does not replenish itself, time frames have little meaning in assessing loss. Secondary impacts of agricultural development, such as increased vandalism, will likely be greater over the long-term. Scientific knowledge obtained from inventory and salvage excavation represent a short-term benefit which would not be likely to outweigh the cumulative long-term loss of cultural resources.

VISUAL RESOURCES

Agricultural development would constitute a long-term change in the appearance of the area. Viewers would see a change from remote, natural vistas to farmland scenes. Both have their scenic qualities and it is difficult to say one is preferred over the other. Perhaps the most prominent, long-term aesthetic loss would be the intrusion of pumping stations, power sub-stations, roads, and pipelines into the Snake River Canyon.

RECREATION

Farm development would result in a permanent loss of at least 111,015 acres of land base for public recreation. In addition, the long-range productivity of the Snake River for water-based recreation uses and sightseeing would be reduced.

Long-range recreation productivity would be further impacted by the conversion of state-owned land within the ES areas to farm development since it is expected that this would occur along with the alteration of BLM land.

Successful farm development may adversely affect long-range recreational uses of other public land in southern Idaho since demands might be made to allow agricultural entry on public land outside of the ES area once feasible farming has been demonstrated.

Upland game bird hunting opportunity would be significantly increased. In terms of overall hunting opportunity, more would be available under the proposed action than is available at present.

WILDERNESS

Implementation of the proposed action would result in no significant short-term use or loss of wilderness resources. Long-term productivity or quality of wilderness resources could diminish slightly due to secondary impacts associated with increased population in the area.

LIVESTOCK GRAZING

In the short-term there would be a loss of at least 14,975 AUMs and possibly up to 41,397 AUMs among 127 livestock operators. Many operators would lose part or all of their customary grazing areas. Depending upon the extent the proposed action is implemented, over the long-term there could be a net loss as high as 41,397 AUMs of grazing use. The affected operators would reduce their operation, go out of business, leave the area, or find other means of getting along.

The AUM loss would be somewhat offset by agricultural crops, such as grain and alfalfa, grown in the ES area. Based upon the assumptions (taken from regional averages), that approximately 6 percent of the 111,015 acres farmed would be in alfalfa, that each acre would yield an average of 3 1/2 tons per acre of hay, and that there are 4 AUMs per ton of alfalfa hay, there would be a total of 93,240 AUMs produced in the ES area under the proposed action from alfalfa alone. However, this increased AUM production would not equalize the 14,975 to 41,397 AUM loss

on public land. The operators within the ES area rely upon BLM range forage at the current cost of \$1.89 per AUM and could not continue to run their operation feeding their livestock alfalfa hay at a cost of \$11.25 per AUM (based upon an average of \$45 per ton of hay). It is expected that most of the alfalfa hay grown in the ES area would be purchased by buyers other than the livestock operators affected by the proposed action.

MINERAL RESOURCES

Short-term use of gravel resources would result in the disturbance of an estimated 300 acres of land. Since such actions can be adequately rehabilitated with proper resource management, the effects would be relatively short-term. Approximately 1.3 million cubic yards of gravel would be used for road construction in farm areas.

TRANSPORTATION NETWORKS

Road systems and utility systems are absolutely necessary to begin and maintain intensive agricultural production. This would involve long-term dedication of about 1,236 acres for the estimated 300 miles of gravel roads needed for the proposed action. Maintenance and periodic upgrading would occur in the long-term.

SOCIO-ECONOMIC

Since the economic feasibility of the proposed action is marginal, short- and long-term changes in socio-economic factors are conditional. If the assumption is made that farm energy costs remain low and crop prices are high (best case), then employment will rise, farm income would increase, and the total market area would gain in earnings. This would be viewed as an increase in the area's economic productivity. In reality, however, all indications are that energy costs will rise dramatically (as much as 100% in the next five years). If farm crop prices stay at about the same level they are now, new farm development would not be economical. In this case, new development would not occur, or newly developed and some older farms would be abandoned. In either of these situations, there would be no economic gains in the market area. There may even be a depression of the local economy and a slight downgrading of social well-being.

ENERGY

From an energy standpoint the critical question relating to the use of the environment is the trade-off between energy impacts and the increase and maintenance of agricultural productivity.

The major energy-related impact resulting from the proposed action is the electricity cost that would be borne by users of electricity other than the proposed action irrigators. This would fall most heavily on the Idaho Power Company (IPC) rate-payers. The annual cost to IPC customers of supplying electricity to the proposed action ranges from \$147 to \$438 per acre (in 1977 constant dollars) for the average acre.

Electricity cost impacts will accumulate in two ways:

1) The cost of electricity forms a part of the cost of almost all products and services. The annual cost of the proposed action and the resulting increase in electricity price will accumulate and multiply as increased electricity costs are passed through the economy. The net effect will be increased inflation.

2) The cost impacts can be expected to accumulate and increase over time. The real price of electricity (as well as other energy forms) has been increasing relative to the rest of the economy, including commodity prices. The trend of rising real prices of conventional energy is expected to continue over the long-term as more demand pressure is placed on the finite supply of energy resources. These trends indicate that if the decision is made to maintain the proposed action in production, the magnitude of the electricity cost borne by IPC ratepayers will increase. This increasing cost will be in addition to all other increases in electricity cost which may occur.

The cumulative impact may be tempered somewhat if electricity use by other customers increases and the cost can be spread over a larger number of users and/or greater use. If electricity use stabilizes or declines relative to other changes in the economy, the cumulative impacts would be more severe as costs would be spread over fewer customers and/or less usage.

Other important cumulative impacts result from the commitment of energy resources to the proposed action. One of these is commitment of fossil fuel resources, which will be discussed in Chapter 7. Another is the commitment of Snake River stream-flow and hydroelectric resources. The proposed action would be an incremental increase in the reduction of Snake/Columbia streamflow. In comparison to total hydroelectric generation on the Snake/Columbia the loss may not be considered large. However, the proposed action is only one of a number of similar current or proposed developments on the Snake/Columbia. The cumulative impact on streamflow and hydroelectric generation of these projects taken together is significant relative to the total generation. In this context the proposed action is an incremental increase in a growing and significant problem--the loss of very low cost and hence, extremely valuable energy resource. As the costs of new electricity generating facilities increase, this hydroelectric resource increases in value.

Short-Term

Over the short-term, the relationship or trade-off between energy impacts and increased productivity can be assessed by comparing the in-

cremental increase in agricultural production with the incremental increase in energy consumption. The 107,685 acres of new farmland represent an increase of about 3.5 percent of the estimated 3.1 million acres of cropland currently in production in 11 southwest and south central Idaho counties that correspond roughly to the IPC service area.

In terms of the IPC service area, it represents about a 6.5 percent increase in the 1.7 million acres under pump irrigation in their area. In terms of crop production, the assumed crop rotation would result in an 8.6 percent increase in Idaho potato production, 15 percent sugar beets, 11.9 percent beans, 4.7 percent spring wheat, 3.2 percent barley, and .6 percent alfalfa over 1976 levels of production.

The increase in electricity consumption is proportionally much greater. The consumption of the proposed action average case represents an increase of 26 percent over 1978 IPC irrigation sales. Proposed action worst case represents an increase of 33 percent over 1977 IPC irrigation sales.

The principal short-term relationship, then, is a relatively small increase in agricultural production at the expense of a much larger increase in electricity consumption. The benefit of this increased agricultural production to society would have to be weighed against the cumulative impacts of increased energy costs.

Long-Term

The short-term analysis has assumed that the proposed action would, in fact, result in an increase in agricultural productivity. This may happen over the short-term, however, a permanent long-term increase in productivity is questionable. From the standpoint of energy and the resulting economics, the proposed action is marginal. An analysis of farm budgets demonstrates that the proposed action would not be economically viable if faced with the full cost of its electricity requirements. The economic viability, if any, depends on the present IPC electric utility rate system which dilutes the real energy cost of new electricity supply by spreading it over all customers regardless of their responsibility for increased demand.

Because of the high energy requirement of the proposed action, it is particularly vulnerable if either a) electricity rates rise significantly faster than crop prices, or b) the electricity rate system is changed such that the proposed action would have to pay the full cost of its electrical requirements. In either case, the productivity of the proposed action would end.

Given the existing electricity rate structure, implementation of the proposed action would raise energy costs to existing pump irrigators, possibly to the point that some existing pump irrigated land may go out of production. As the price of energy increases over time, the total cost burden of the proposed action on existing irrigators would be expected to increase if it is decided to keep the proposed action in

production. The long-term result may well be no net gain in south Idaho agricultural production but, assuming the proposed action is maintained in operation, a net increase in agricultural energy consumption and electrical cost to all users.

SUMMARY

If the proposed action is implemented, there would be permanent changes in land use, and many trade-offs would occur. Up to 148,000 acres of rangeland would be replaced by 107,685 acres of farmland and about 40,315 acres of public use areas, wildlife tracts, and other related uses. The dominant existing use - livestock grazing - would be replaced by intensive irrigated crop production. Contrary to the past, it is not likely that urban development will follow.

Although no threatened or endangered species (plant or animal) would be affected, some wildlife species like the burrowing owl, curlew, and ferruginous hawk would decline in numbers. These animals would be replaced by other species like pheasants and quail. The natural landscape would be replaced by a rural, agricultural landscape. A few archeological values would be lost but a greater knowledge of the area's archeological values would be gained. Some recreational pursuits - ORV's - would be replaced by new upland game hunting opportunities.

Short-term land productivity will be greatly increased, as will human productivity (see Vegetation discussion above). Use of the study area by predominately agricultural activities would displace few land uses that cannot be accommodated elsewhere.

In most cases, there would be a long-term gain to offset a short-term loss. In some cases there are losses that would not be offset: declining air quality, lowered soil productivity, a decrease in game fish and increase in non-game fish species, a detraction from the natural scenic qualities of the Snake River Canyon, and water diversion from the Snake River.

Energy, and its related costs, have a greater effect on the long-term productivity of the environment affected than any other factor. Although the proposed action is in line with growth trends and does not foreclose any important long-range options for enhancing the productivity of the area, it appears the cost of energy, and the increasing value of water, will make the proposed action obsolete in the near future. At least, it is not adequate for the long run.

CHAPTER 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Chapter 7 quantifies, where possible, those impacts that would cause irreparable or permanent changes to the environment as a result of the proposed action.

CHAPTER 7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This chapter identifies the irreversible and irretrievable commitment of resources resulting from the proposed action. For purposes of this chapter the term "irreversible" is defined as incapable of being reversed - once initiated, use, direction, or condition would continue. The term "irretrievable" is defined as irrecoverable - once used, not readily replaceable.

AIR QUALITY

Farming operations would contribute to a slight irreversible degradation of air quality.

WATER RESOURCES

Once water was diverted to farmland developed under the proposed action, it would be a "water right" and considered an irreversible and irretrievable resource commitment. An estimated 277,827 acre feet of water would be required of which 250,000 acre feet would be pumped from the Snake River. This would be a block of water removed from the Snake/Columbia system that could not be used for other purposes.

Groundwater supplies would gradually diminish between Bruneau and Murphy as 27,827 acre feet were pumped each year for irrigation in this part of the ES area.

VEGETATION

An irreversible and irretrievable loss of 77,925 acres of natural range vegetation and 33,090 acres of rangeland grass seeding would occur.

WILDLIFE

The proposed agricultural development would result in an irreversible and irretrievable change in native wildlife that inhabit land converted to farms. Although several are adaptable and can survive, complete elimination of numerous species in portions of the ES area would be expected. This would include several small mammals, some

of which are primary food sources for many raptors (pygmy rabbit, black-tailed jackrabbits, and various rodents). It is expected that the numbers and varieties of raptors would decline due to the elimination of this food supply.

Birds which are dependent upon shrub/grassland habitat type during their reproductive period would show population declines (sage sparrow, sage thrasher, vesper sparrow, black-throated sparrow, lark sparrow). Sage grouse would suffer the loss of one strutting ground. About nine percent of a mule deer wintering range would be lost through agriculture land conversion.

There would be losses in fishery stocks as a result of the proposed action. Because the water diversion proposed for the project is not reversible, the fishery loss must be considered irretrievable. Losses in game-fish stocks will amount to 5 to 25 percent of the present abundance.

CULTURAL RESOURCES

Any site destruction, by mistake or by salvage, represents an irretrievable and irreversible loss to that portion of the cultural resource base. At present, there is inadequate inventory data available to estimate the total amount of site destruction that would occur from the proposed action.

VISUAL RESOURCES

The proposed action would irreversibly and irretrievably eliminate the natural landscape features on 111,015 acres of rangeland. Visual resources within the Snake River Canyon would be irreversibly and irretrievably modified from development of service facilities such as roads, pipelines, pump stations, and transmission lines. Views from Oregon National Historic Trail and the historic Kelton Road would be modified by farm developments.

RECREATION

There would be an irreversible and irretrievable loss of at least 111,015 acres of land base to existing recreational opportunities. Of this land area 60,400 acres are currently used for off-road vehicle activity.

LIVESTOCK GRAZING

There would be an irreversible and irretrievable loss of up to 41,397 AUMs of grazing use each year in the ES area due to the proposed action.

MINERAL RESOURCES

The use of an estimated 1.3 million cubic yards of gravel would constitute a commitment of resources that would be irreversible and irretrievable.

SOCIO-ECONOMIC

An unquantifiable amount of farming equipment and machinery; wood, wire, and cement for fencing; gasoline and oil; fertilizer, herbicides, and insecticides, and associated implements; housing construction materials; and heating and cooling energy requirements are items which would be irreversibly and irretrievably committed.

The necessary capital investment would be irreversible and a certain amount would be irretrievable. The personpower requirements would be irreversible and irretrievable.

ENERGY

Electrical

Once generated and consumed, electricity is irretrievable. The commitment of electrical generating capacity to the proposed action is, however, reversible, assuming there would be some market that would use the electricity.

Fossil fuel consumed in generating the electricity would be the principal energy resource that would be irreversible and irretrievably lost.

In the "most likely" electricity supply scenarios detailed in Chapter 3 new electricity supplies obtained in response to the proposed action load would be coal-fired plants. To supply the direct electricity consumption of the proposed action in the average case year, account for line losses, and replace lost hydroelectricity would require the generation of 569.3 million KWH per year on the Idaho Power Company (IPC) system plus an additional 149.0 million KWH to replace hydro losses at the Snake River and Columbia River Dams downstream from IPC.

Assuming the conversion of 10,500 BTU per KWH in a coal plant, this electricity generation would require 5.8 trillion BTU per year on the IPC system plus another 1.6 trillion BTU per year hydro losses, for a total of 7.4 trillion BTU per year.

The BTU value of coal can vary considerably. Southwestern Wyoming coa, contracted by IPC for the proposed "Pioneer" plant, has a heat value of about 9,500 BTU per pound. If the total electricity requirements of the proposed action were met with coal-fired generation using this Wyoming coal, about 308,000 tons of coal would be consumed annually for the IPC system plus an additional 82,000 tons to compensate for Pacific Northwest losses, for a total annual coal consumption of 390,000 tons.

In addition to the coal, there are a number of significant secondary energy uses associated with the operation of a power plant. These would include petroleum consumption by coal mining machinery, by transportation of the coal from mine to power plant, and for some power plant operations. Without having information on plant location, mine location, and type and plant design, this consumption cannot be quantified.

Chemical

The energy consumption represented by the use of gasoline, diesel, fertilizer, and pesticides on the proposed action is irreversible and irretrievable. The significance of the chemical energy consumption is not so much the relative magnitude of this use but rather the fact that these energy forms are non-renewable and limited in supply.

Chemical energy consumption would be less than the coal consumed in the generation of electricity for irrigation. However, most of the chemical energy consumption would be petroleum. This includes the direct use of gasoline and diesel plus feedstock and manufacturing energy for fertilizer and pesticides. The estimated annual nitrogen fertilizer consumption of the proposed action would result in the annual consumption of about 240 million cubic feet of natural gas from which the fertilizer is made (assuming 38,000 cubic feet per ton of nitrogen-see Chapter 2, Technical Report).

Supplies of petroleum and especially natural gas are much more limited than coal. Further, much of the U.S. petroleum and natural gas supply is imported. Proposed action petroleum consumption would therefore have a cumulative impact when considered along with other activities that are increasing U.S. petroleum consumption.

CHAPTER 8

ALTERNATIVES

Chapter 8 describes several alternatives to the proposed farm development. An assessment of the impacts expected to occur from each alternative is presented.

CHAPTER 8 ALTERNATIVES TO THE PROPOSED ACTION

DESCRIPTION OF ALTERNATIVES

Six alternatives to the proposed action are discussed in this chapter. They are categorized as "Main Alternatives" and "Subalternatives." Alternative 1, 2 and 3 (Main Alternatives) address different levels (acreages) of farm development under CA and DLA. Alternatives 4, 5 and 6 (Subalternatives) address different authorities for land disposal under the Federal Land Policy and Management Act of 1976 (FLPMA) that could be used instead of CA and DLA. The FLPMA authorities could be used to permit farming under the proposed action level, Alternative 1 level, or Alternative 2 level, or any other acreage level.

The development features (stages of implementation and discrete operations) described in Chapter 1 and mitigating measures described in Chapter 4 apply to these alternatives as well as the proposed action.

Main Alternatives:

- (1) Maximum (176,310 acres) Farm Development Under DLA and CA Authority.
- (2) Minimum (28,590 acres) Farm Development Under DLA and CA authority.
- (3) Allow no agricultural development, reject all existing DLA and CA applications, and impose a moratorium on further filings.

Subalternatives: Federal Land Policy and Management Act of 1976 (FLPMA)

- (4) FLPMA Lease Farm Development
- (5) FLPMA Sale Farm Development
- (6) FLPMA Exchange Farm Development

MAIN ALTERNATIVES

Alternative 1: Maximum Farm Development

This level of farm development would involve land disposal under DLA and CA as with the proposed action. It would, however, allow a larger amount of public land to be developed. The proposed action is based on permitting agriculture conversion primarily on Class I and II soils (the best quality). This alternative would allow new farming on Class I, II, and III soils. Class III soils are considered marginal, of poorer quality and produce lower crop yields. In many cases, never the less, it is possible to farm Class III soils.

Overlay 2A and 2B (in back leaf of this document) illustrates 235,080 acres that were delineated in the ES area as suitable for development under this alternative. Of this amount, 25 percent would be reserved for public purpose tracts, similar to the proposed action, leaving 176,310 acres to actually be farmed. As with the proposed action, the public purpose tract locations are not identified, but location selection would be based on wildlife habitat needs, sand and gravel deposits, sanitary landfill sites, etc. Orderly development would take place in the ES area at about 35,000 acres per year from 1980 through 1984.

Alternative 2: Minimum Farm Development

This alternative calls for development by DLA and CA of Class I and II soils that are found under 500 feet elevation above the Snake River. This alternative is keyed to the rising electricity costs of high-lift pumping irrigation water from the Snake River. With this alternative, it is assumed that pumping water more than 500 feet above the Snake River would not be economically feasible for new farm projects between 1980 through 1984.

Overlay 3A and 3B depict a total of 38,120 acres for development under the minimum alternative. As with the proposed action and maximum alternative, 25 percent, or 9,530 acres, would be reserved for public purpose tracts. This leaves 28,590 acres that could actually go under plow. About 5,700 acres per year would be developed from 1980 through 1984.

Alternative 3: Allow No Farm Development

This alternative would allow no immediate farm development. Existing DLA and CA applications would be rejected and a moratorium imposed on future applications. This alternative would eliminate the possibility of any public land within the ES area of being immediately developed under CA, DLA, or FLPMA. It would hold land with agriculture potential in a status that would not preclude development at a later time. This alternative would not preclude farm expansion on private land within the ES area.

SUBALTERNATIVES

On October 21, 1976, Congress passed Public Law 94-579, the Federal Land Policy and Management Act (FLPMA). This act is commonly referred to as BLM's Organic Act and has some far reaching implications concerning the management of public land. This Act established the policy that public lands be retained in public ownership for multiple-use management and requires that any disposal of public land be in the national interest. It mandates land use planning and stresses environmental quality on public land administered by BLM. Under FLPMA, agricultural development can take place through lease or sale of public land or land exchanges with other landowners. At the time of this writing regulations concerning sale, lease, and exchange of public land have not been formalized. The FLPMA subalternatives to the proposed action and main alternatives (1) and (2) are as follows:

Alternative 4: FLPMA Lease

Section 302 of FLPMA authorizes the issuance of short or long-term leases (up to 30 years) to individuals to use public land for crop cultivation. Under lease provisions, there are no acreage limitations on the land to be farmed, and rental rates to the BLM would be based on fair market value. BLM would retain control over farming operations by requiring the lessees to comply with certain conditions in the lease grant. These conditions would be oriented toward soil conservation practices, wildlife preservation, and other environmental protection measures on the farmland under lease. A lease program would give BLM maximum flexibility and control of agricultural development on public land.

Under FLPMA lease, the BLM would lease public land in the ES area for farming. The BLM could lease any level of public land, from 1 acre up to 176,310 acres identified for farm development under the maximum alternatives. The land would be farmed by a private individual (much the same as a tenant) or some other private entity. Since ownership of the land would still be by the federal government, BLM would retain management controls. Under conditions of a lease, BLM could terminate or suspend the lease if the lessee did not comply with the lease conditions. Likewise, the lessee could relinquish the lease as long as the land was rehabilitated to the satisfaction of the BLM authorizing officer.

Since BLM is responsible for multiple use resource management, farm conservation practices and public benefits would be required under a farm lease arrangement. Emphasis would be put on sound soil conservation practices, wildlife habitat enhancement, environmental considerations and public recreation. These management concepts would be incorporated as conditions of the lease granted to the farmer. In keeping with this concept, BLM would establish the following management goals for FLPMA farm leases.

1. Recreation: Allow public access and recreation on leased land for hunting purposes as long as such access does not interfere with farm operations or jeopardize the lessees investment. This access may be designated by permission only.

2. Cultural Resources: Require lessee to cease operations and notify the BLM authorizing officers if a cultural site is found during construction activities.

3. Soils: Prior to the allowance of agricultural development, the grantee shall adopt and then abide by a Soil Conservation District Management Plan. These plans shall incorporate Best Management Practices (BMPs) to insure soil conservation and water quality protection. The BMPs should include, but not be limited to, the following control measures:

- A minimum of 25 percent of the lease acreage would be planted to "soil building crops" (alfalfa, grain, etc.) each year. This would mean that 25 percent of the acreage would have a crop cover year around.

- Minimum tillage practices to reduce soil compaction and use selective herbicides in lieu of tillage, for weed control, to reduce soil compaction.
- Chisel plowing practices which loosens soil without inverting surface soil. This practice shatters restrictive layers and pans which inhibit water and air movement through the soil.
- Establishment of on farm catchment basins or ponds to collect excess irrigation run off.
- Winter grain or other suitable crops would be planted immediately following harvest of potatoes, sugar beets, or beans to provide a cover crop to help retard soil erosion caused by spring winds. This grain can be plowed under and used as a manure crop prior to planting row crops the following spring.

4. Visual: Utilize the VRM system for the design and placement of buildings, fences, pumps, power lines, etc., on the farmland under lease.

5. Wildlife: Wildlife habitat enhancement would be a major feature of the FLPMA lease program. The lessee would:

- Be required to maintain in suitable condition certain important wildlife habitat on the leased farmland.
- Be required to irrigate selected habitat within the farm for wildlife benefits.
- Be required to establish vegetation (dryland shrubs, forbs, grasses and/or trees) at strategic locations on wildlife isolated tracts and/or leased farm land for wildlife habitat.
- Be required to establish boundary fences on those wildlife isolated tracts that fall within the leased farmland, or along the common boundary of an isolated tract that may be adjacent to leased farmland.

Each leased farm unit would require site specific stipulations to implement the intent of the above management goals. These stipulations could vary from one farm to the next depending on its location, farming techniques, etc. The prospective lessee would be required to submit his plan of development to the BLM for approval. The BLM would approve the plan based on farm economics, land use planning and environmental consideration. A Soil Conservation District Management Plan also would be required by BLM. The local Soil Conservation District would recommend the plan with final approval by BLM. The lessee would use the Best Management Practices deemed feasible in the Soil Conservation District Management Plan for his particular farm operation. BLM personnel or an authorized representative would conduct periodic compliance checks to assure the lessee was farming in accordance with the BMPs in his lease agreement.

Alternative 5: FLPMA Sale

Section 203 of FLPMA authorizes BLM to sell public land for agricultural purposes at a price no less than fair market value. A tract that is sold for farmland can be no larger than necessary to support a family size farm. An economically profitable family size farm unit would vary from region to region, depending on soil fertility, growing season, crop yields, crop rotation, operational cost, etc. This does not preclude the sale of parcels smaller than a family size farm in order to expand an existing farm operation. Under FLPMA sale provisions, the BLM could include covenants, terms, conditions, and reservations in the patent documents to insure proper land use and protection of the public interest. Land sales can be made by competitive bidding, modified competitive bidding, or negotiations as determined by BLM.

Covenants, terms, conditions, and reservations would not be inserted by BLM where existing state or local laws, regulations, or ordinances would adequately insure proper land use and protection of the public interest. Under FLPMA Sale, the BLM proposes to insert the following covenants, terms, conditions, and reservations in patents for tracts sold for farming purpose in the ES area:

1. To assure soil conservation and water quality protection, all agricultural operations on the land would be in accordance with and would abide by a Soil Conservation District Management Plan incorporating Best Management Practices (BMPs). The BMPs should include, but not be limited to, the following control measures:

- A minimum of 25 percent of the lease acreage would be planted to "soil building crops" (alfalfa, grain, etc.) each year.
- Minimum tillage practices to reduce soil compaction. Selective herbicides in lieu of tillage, for weed control, to reduce soil compaction.
- Chisel plowing practices which loosens soil without inverting surface soil. This practice shatters restrictive layers and pans which inhibit water and air movement through the soil.
- Establishment of on- farm catchment basins or ponds to collect excess irrigation run- off.
- Winter grain or other suitable crops would be planted immediately following harvest of potatoes, sugar beets, or beans to provide a cover crop to help retard soil erosion caused by spring winds. This grain can be plowed under and used as a manure crop prior to planting row crops the following spring.

2. The land to be patented shall be perpetually preserved for agricultural land uses. This is in keeping with the goals to 1) preserve the amount of productive agricultural land for food production,

2) preserve productive farms by preventing incompatible land uses, 3) maintain a viable agricultural base to support agricultural processing and service industries in the area, 4) and reduce costs of providing services to scattered non-farm uses.

3. Landowners receiving patent to farmland would maintain a fenced boundary around any wildlife isolated tract that falls within the farm unit or along the common boundary of any isolated tract adjacent to the farm unit.

4. Reservation of public access for recreational hunting under "hunting by permission only" procedure.

5. Reservation of right-of-way under Section 508 of FLPMA for public purpose types of right-of-way (power lines, canals, roads, etc.).

Alternative 6: FLPMA Exchange

The BLM can trade public land for private land where a public benefit is evident, under Section 206 of FLPMA. Land exchanges may be initiated by either party, and there are no acreage limitations in this type of transaction. In cases where the fair market value of properties in the exchange are not the same, a monetary payment by either party up to 25 percent of the value of the public land involved is allowed to equalize the two land values. Under this method, public land acquired by a private individual could be developed into farmland. In this case, the BLM would take over management of the new land acquired and relinquish control of public land traded in the exchange. As mutually agreed upon, either party could include covenants, terms, conditions, and reservations in the patent documents similar to FLPMA Sale.

In addition to the DLA and CA applications, there are currently two exchange proposals that involve public land in the ES area. The exchange proponents (the private land owners) are offering to trade approximately 800 acres of land they own for about 3500 acres (see Map 1-3) of public land in the ES area that they wish to farm. The private land offered has some high recreation, scenic, wildlife, and watershed values. At this time, the BLM has not made a decision to process these exchange proposals. Under FLPMA exchange, the BLM proposes to insert into the patent the same provisions as are discussed in the previous FLPMA Sale section.

IMPACT ANALYSIS

The assumptions and analysis guidelines (page 3-1) used to analyze impacts for the proposed action in Chapter 3 were also used to guide impact assessments for the six alternatives discussed in this chapter. In addition, all mitigative measures identified in Chapter 4 were incorporated in the impact assessments. Therefore, the environmental impacts depicted for each alternative in this chapter are the residual impacts left after Chapter 4 mitigative measures were applied.

ALTERNATIVE 1: MAXIMUM FARM DEVELOPMENT

CLIMATE

Impacts would be the same as for the proposed action.

AIR QUALITY

Air quality would be affected most by an increase in total suspended particulates. The total suspended particulates can be expected to be almost twice as much as the proposed action because of the greater acreage in farmland. The duration would be the same as the proposed action. Air quality standards will be exceeded during the months of March, April, and May. Dust storms would be severe but infrequent (less than 10 days per year). These storms would cause highway safety problems, maintenance problems on local roads caused by soil drifts, and a nuisance to the area in general when airborne soils are deposited. Communities most impacted in or near the ES area would be Hammett, Hagerman, Bruneau, Grandview, Buhl, Glenns Ferry and Twin Falls.

GEOLOGY AND TOPOGRAPHY

There would be no impacts to geology and topography.

SOILS

One hundred seventy six thousand three hundred and ten acres of new farmland would be developed under this alternative. This would include the Class I and II soils to be developed under the proposed action, plus about 65,300 acres of additional Class III soils. Impacts on Class I and II soils would be the same as discussed in Chapter 3. This section will focus on impacts associated with farming on Class III soils.

Depth of Class III soils are from 10 to 20 inches. They can have high amounts of coarse fragments (rocks) with textures that range from clay to loamy fine sand. There can be saline alkali problems with or without heavy subsurface structures. Slope can range from 0 to 20 percent.

The above described characteristics of Class III soils will drive farm costs up. Land leveling can expose unproductive subsurface layers or bedrock, or bring saline or alkali layers closer to the surface which will decrease potential production. Table 2-2, Chapter 2 illustrates that Class III land produces lower crop yields.

Because economic returns are lower, double cropping or growing cash crops will be less feasible on Class III soils. Where row crops are grown, lower economic returns to the farmer may prevent him from planting winter cover/soil building crops. This will result in more land being fallow exposing soil to wind and water erosion conditions. The lack of cover crops during winter months along with not incorporating green manures and the steeper slope conditions, all combine to make Class III soils subject to more erosion. In addition, Class III soils are shallower than Class I and II, and therefore productive soil zones can be removed sooner by erosive forces.

Erosion on a per acre basis and total overall erosion will be higher under the maximum development alternative than for the proposed action. Total erosion is predicted to be about 10 to 15 percent higher.

WATER RESOURCES

Uses and Flows

Surface Water

Approximately 357,000 acre-feet of water would be diverted from the Snake River. The following table indicates the impact of this withdrawal on mean flows at Murphy:

TABLE 8-1
SNAKE RIVER FLOWS (CFS) AT MURPHY WITH MAXIMUM FARM DEVELOPMENT -
BASED ON AVERAGE FLOW

<u>Month</u>	<u>Mean Flow Before Wdwl.</u>	<u>CFS Net Withdrawal</u>	<u>CFS Remaining</u>	<u>Percent Reduction</u>
May	9312	762	8550	8
June	8106	1342	6764	17
July	6926	1410	5516	20
Aug	7124	1138	5986	16
Sept	8420	662	7758	8
Oct	9559	185	9374	2

SOURCE: IDWR 48 year flow records. Includes approximately 90 CFS return flow from project.

As this table indicates, maximum mean flow reduction would be 20 percent in July, and 17 percent in June. Although not shown on this table, mean flow reduction would be negligible in winter months.

Because low-flow years are often more important to fisheries than average-flow years, it is important to examine the effects of maximum development on low-flows.

In a low-flow year such as 1977, reductions in flow would be more severe. As the following table shows, maximum reduction would be 25 percent in July, followed by June with 21 percent, and August with 19 percent.

TABLE 8-2
SNAKE RIVER FLOWS (CFS) AT MURPHY WITH MAXIMUM FARM DEVELOPMENT-BASED ON LOW-FLOW YEAR (1977) SHOWING MEAN LOW-FLOWS AND ACTUAL LOW-FLOW

<u>Month</u>	<u>Mean Flow Before Wdwl.</u>	<u>CFS Net Withdrawal</u>	<u>CFS Remaining</u>	<u>Percent Reduction</u>
May	6848	762	6086	11
June	6495	1342	5153	21
July	5657	1410	4247	25
Aug	6107	1138	4969	19
Sept	6835	662	6173	10

SOURCE: IDWR 48 year flow records, including approximately 90 CFS return flow.

Because of fish spawning in the period May to July, it is also instructive to examine the effects of the maximum-development alternative on the low one-day flows in these months in the low-flow year 1977:

TABLE 8-3
SNAKE RIVER LOW ONE-DAY FLOWS AT MURPHY WITH MAXIMUM FARM DEVELOPMENT BASED ON LOW-FLOW (1977), SHOWING ACTUAL LOW ONE-DAY FLOW FOR EACH MONTH

<u>Month</u>	<u>Low One-Day Flow Before Withdrawal</u>	<u>CFS Withdrawn</u>	<u>CFS Remaining</u>	<u>Percent Reduction</u>
May	6000	762	5238	13
June	5120	1342	3778	26
July	5270	1410	3860	27

SOURCE: IDWR 48 year flows, including approximately 90 CFS return flow.

Although 1977 can be considered a year of unusually low-flows, it is also true that in the period 1968-1977, low one-day flows in June would have been below Idaho Fish and Game (IFG) recommended resource maintenance flows (5500 CFS at Murphy) in 4 of the 10 years under the maximum development alternative (1963-3.8 percent below; 1973-12 percent below; 1976-5 percent below; 1977-31 percent below).

Groundwater

Approximately 97,900 acre feet of groundwater would be required to irrigate 37,944 acres (see Table 1-3, Chapter 1). Based on current knowledge, this would adversely affect existing users as the aquifer would likely be depleted.

Impact Summary

In summary, in average years the maximum development alternative would not reduce mean flows at any river point below the resource maintenance flows recommended by IFG. In a low-flow year such as 1977, the project would reduce mean flows in summer months as much as 25 percent below IFG recommended flows. The daily low-flow for the months of May through July would be reduced as much as 27 percent below IFG recommended resource maintenance flows. The State's established flow of 3300 CFS at the Murphy gage would not be reached under this alternative.

Water Quality

Accurate and precise quantitative estimates of water quality changes caused by this alternative are not possible. Based on experience and knowledge of the personnel writing the water quality sections of the ES, the following quantitative impacts are used: very slightly - 0 to 1 percent; slightly - 1 to 5 percent; moderate - 5 to 25 percent; heavy -25 to 50 percent.

Snake River

Turbidity would decrease slightly above C.J. Strike in both average and low-flow years. Below Strike, turbidity would decrease very slightly in average and low-flow years. Occasional accidents to water-delivery systems and intense summer storms would deliver sediments to the Snake River via tributary streams. Winds in spring and early summer will also carry sediments from project lands to the river. The magnitude of these sediment movements cannot be predicted. Water temperature would increase slightly below C.J. Strike because of shoaling--reduction in depth with moderate change in wetted perimeter. This slight increase would further raise existing temperatures which already often lie above state water quality standards.

Conductivity would increase slightly in average and low-flow years and in all reaches of the ES area pH would increase slightly. Nitrates would increase slightly in all reaches. Total phosphorus would decrease slightly above C.J. Strike and would not change in average or low-flow years below C.J. Strike. Occasional accidents to water delivery systems and intense summer storms would deliver phosphates adsorbed to sediments to the Snake River via tributaries. Winds would also carry phosphates to the river from project lands.

Bacteria, heavy metals and pesticides would decrease very slightly in all reaches of the Snake River in the ES area in average-flow years, and would decrease slightly in low-flow years. Occasional accidental overland flows from irrigation systems and intense summer storms or winds would carry heavy metals and pesticides adsorbed to sediments to the river in unpredictable quantities.

Light penetration to the river bottom will be greater as a result of this development alternative because water depth in the river will be reduced.

Benthic invertebrates density per unit area would increase slightly above C.J. Strike and very slightly below Strike in all years, but reductions in wetted areas caused by reduced stream flow would offset the beneficial effect.

Tributary Streams

In tributary streams in all years, flows would increase moderately to heavily. Conductivity, nitrates, and benthic invertebrates would also increase moderately to heavily. There would be slight to moderate decreases in bacteria, total phosphorus, toxicants, turbidity and temperatures. Occasional accidents or high-intensity summer storms would deliver phosphorus, pesticides, heavy metals and sediments to tributary streams by overland flow and wind. The magnitude of movement of these materials from project lands to streams is not predictable.

In tributary streams, beneficial impacts would include moderate increases in flow and benthic invertebrates, and moderate decreases in bacteria, phosphorus, toxicants, turbidity, and temperatures.

Downriver From The ES Area

Between the lower end of the ES area below Homedale and the upper end of Brownlee Pool (about 55 miles), the effects discussed previously for water quality would extend for only about 16 miles before inflows from major tributaries (Malheur, Boise, Owyhee Rivers) would make project-caused water quality changes indiscernible. All water quality effects would disappear below Brownlee Pool, since Brownlee Pool acts as a nutrient and sediment trap.

Groundwater

The impacts under this level of development would be the same as the proposed action; but, they would be of a greater magnitude because a greater area would be irrigated. Perched water tables containing some pollutants (fertilizer residues and pesticides) would be more common. Some of this water would appear as seeps in canyon walls and topographic lows. These could eventually drain back into the Snake River.

Impact Summary

In summary, adverse impacts upon Snake River water quality would include slight increases in nitrate in all flow years (see aquatic vegetation for impacts). Temperatures would increase slightly as water depth decreases. Of minor adverse impact would be slight increases in conductivity in all flow years. In comparison to the Snake River, tributary streams would be more severely affected by increases in conductivity and nitrates.

Beneficial impacts upon the Snake River water quality as the result of this alternative would include slight decreases in bacteria, toxicants, and turbidity; slight decreases in phosphorus; and slight to moderate increases in density of benthic macroinvertebrates above C.J. Strike in all flow years. The latter affect will be offset by loss of total area for plant and insect production, caused by reduced stream flow.

VEGETATION

Terrestrial

The 439,303 acres of public land within the ES area consist of approximately 275,583 acres of sagebrush/grassland, 87,085 acres of seeded grassland, 42,810 acres of salt-desert shrub/grassland, and 33,825 acres of natural grassland. Overall the current vegetation is in relatively poor range condition.

The major impact to terrestrial vegetation would be the conversion of rangeland to cultivated farmland. Approximately 76,166 acres of sagebrush/grassland, 43,250 acres of seeded grassland, 36,834 acres of salt-desert shrub/grassland and 20,060 acres of natural grassland would be cleared (see Map 2-5 and Overlays 2A and 2B). These 176,310 acres would be replaced by approximately 37,624 acres of potatoes, 35,914 acres of dry beans, 29,074 acres each of winter wheat, barley, and sugar beets, 10,261 acres of alfalfa, and 5,289 acres devoted to non-crop land uses (based upon predicted crop rotations).

In addition, 58,770 acres of public land would be reserved as public purpose tracts. Of this, up to 30,770 acres would be subject to vegetation removal as needed for airstrips, sanitary land fills, and other facilities in support of farm development. The remaining 28,000 acres would be reserved for wildlife enhancement with native vegetation left intact.

This extensive change in vegetation would in turn impact other resources such as wildlife and livestock grazing. Refer to these sections for impact analysis.

Riparian

Increased water flow volumes and additional plant nutrients in tributaries would tend to stimulate riparian growth, and overall riparian vegetation would probably increase as a result of infiltrated irrigation water reaching stream courses.

Aquatic

Quantifying terms used in the following aquatic section are defined as: very slightly - between 0 and 1 percent; slightly - between 1 and 5 percent; moderately - between 5 and 25 percent; heavily - between 15 and 100 percent.

Because of slightly reduced turbidity and increased nitrates, phytoplankton would increase moderately in all flow years above C.J. Strike and slightly below Strike. Attached benthic algae and rooted aquatic plants would increase moderately because of greater light penetration due to slightly reduced turbidity and decreased water depths (which permit more light to reach the stream bottom).

In tributaries where there would be increases in flow, reduced turbidity and increased plant nutrients, attached benthic algae and rooted aquatic plants would increase moderately to heavily in all flow years.

Effects of Different Land Disposal Methods:

Accidental arrival of sediments, heavy metals, pesticides and plant nutrients from ES land into tributaries and the main Snake would be less under CA disposal than DLA. Thus there would be less likelihood that pesticides and heavy metals would be bound up in aquatic plant tissue for later concentration to invertebrates, fish, and bald eagles.

Threatened and Endangered Plants

Table 8-4 shows information on known sites of five species regarded as threatened or endangered which occur within the maximum development area. Similar to the proposed action, these plants will be protected and preserved, as required in the Endangered Species Act of 1973. No development would be allowed where these plants are found; therefore they would not be impacted.

Impact Summary

Approximately 171,021 acres of the present shrub and grass rangeland would be replaced by agricultural cropland, and up to 36,059 acres would be subject to clearing for non-crop land uses associated with farm development.

TABLE 8-4
THREATENED AND ENDANGERED PLANT SITES UNDER
MAXIMUM AND MINIMUM DEVELOPMENT ALTERNATIVES

Common Name	Current Status	Approximate total area of sites under:		Approximate percent of known Idaho population occurring under:		Approximate percent of known Idaho population occurring within ES Area
		Maximum Development	Minimum Development	Maximum Development	Minimum Development	
Murphy milkvetch	candidate for Idaho's Endangered List. May be proposed to the Federal Register of Endangered Plants.	3400 acres	0 acres	6%	0%	15%
Mourning milkvetch	candidate for Idaho's Threatened List	35 acres	0 acres	1%	0%	5%
Matted milkvetch	same as above	120 acres	0 acres	10%	0%	50%
Large flowered gymmosteris	same as above	25 acres	0 acres	30%	0%	50%

SOURCE: Threatened and Endangered plant inventory and study, 1978, BIM.

Under this alternative there would be a slight to moderate increase in phytoplankton quantity and bloom life, and a moderate increase in abundance of attached benthic algae and rooted aquatic plants in the Snake River and tributaries.

No impacts to threatened or endangered plants would be allowed to occur, as required in the Endangered Species Act of 1973. As a result of this extensive loss of present vegetation, other resources such as wildlife and livestock grazing would be adversely impacted (refer to these sections in this chapter for analysis).

WILDLIFE

Terrestrial

The maximum development alternative would result in an increased level of native wildlife habitat loss resulting in a decline of most wildlife populations in the area. This alternative increases the amount of land proposed for agricultural development by 62 percent as compared to the proposed action. For this reason implementation of this alternative would increase the magnitude and intensity of adverse impacts to native wildlife dependent upon the shrub/grassland, and grassland habitat types. It could result in the loss of existing natural vegetation on up to 207,080 acres (176,310 acres for farms and approximately 30,770 acres for public purpose tracts not used for wildlife leave areas).

A total of up to 132,531 acres of the shrub/grassland type and 74,549 acres of grassland type, would be lost if the maximum development alternative is used.

For animals such as pheasants, Hungarian partridge, and Valley quail, new habitat would be created as new agricultural land is developed near existing natural vegetation. This would create an edge, or ecotone, thereby increasing habitat diversity. Increased habitat diversity leads to increased wildlife diversity. However, acre-per-acre, large continuous agricultural projects provide less edge effect than smaller farms. As a result, wildlife species would be less abundant on large agricultural development ecotones than on the smaller farm units.

Under this alternative, BLM would set aside about 28,000 acres of isolated wildlife tracts among the 176,310 acres of new farmland. The selection criteria BLM would use is discussed in Appendix 1-1. These isolated tracts would provide year-round habitat for upland game birds. They would be primarily used by pheasants during winter and spring periods for shelter, feeding, and nesting when adjacent farmland is not useable for these needs.

All impacts discussed in Chapter 3 are applicable to the maximum development alternative and will not be repeated in this section. The additional specific impacts that would result from this alternative are discussed below.

Mule Deer

Approximately 2260 acres of agricultural land are proposed for development by this alternative within the deer winter range shown on Map 2-6. This is equal to approximately 16 percent of the total winter range acreage which lies within the ES boundaries.

As explained in Chapter 3 conversion of this native range to agricultural land would result in a loss of vegetation which is important for the survival of deer using this winter range. The shrub/grassland type which would be lost is used for forage and cover. Loss of this type due to the maximum development alternative would act to displace and subsequently result in an estimated loss of 80 to 120 deer or 16 to 24 percent of the mule deer using the winter range within the ES area. Increased agricultural oriented human activity would also play a part in the above mentioned deer loss by causing additional physical stress to these animals.

Waterfowl

Waterfowl's feeding use of cropland, primarily the cereal grain crops which would comprise approximately 58,147 acres, would be expected to increase because more cropland would be available.

Western Burrowing Owl

Implementation of the maximum development alternative would adversely impact the western burrowing owl by converting seven of the nine known areas occupied by this bird to agricultural land. This is a higher loss of habitat to these owls than was presented in the proposed action. All other impacts described in Chapter 3 concerning this bird are applicable to this alternative but the intensity and magnitude of these impacts would increase.

Sensitive species mitigating measures under the maximum development alternative would be the same as those described in Chapter 4. It is expected that this measure would significantly reduce the impact on the burrowing owl.

Impact Summary

Implementation of the maximum development alternative would result in an increased conversion of existing vegetation to agriculture, an increase by 62 percent as compared to the proposed action. Specifically, up to 132,531 acres of the shrub/grassland habitat type and 74,549 acres of the grassland habitat type would be lost. Hunting, nesting and cover areas used by native wildlife in the ES area would be substantially reduced. This loss represents significant habitat alteration and would result in an overall increased magnitude and intensity of adverse

impacts to native wildlife now occupying these areas. Conversely, those wildlife species adapted to agricultural land (pheasants, Hungarian partridge) would show marked population increases due to new production of this type of habitat, and the isolated wildlife leave tracts. Waterfowl feeding opportunities would benefit on the 58,147 acres of grain crops estimated with this alternative.

Those wildlife species which are particularly sensitive to human disturbance, such as raptors and long-billed curlews would suffer greater losses (as compared to the proposed action) should this alternative be implemented. In general, those wildlife species which would show significant population declines in the ES area due to a high level of habitat loss (as well as human disturbance) include; pygmy rabbits, many small non-game mammals (which serve as an important prey source), sage grouse, most raptor species including the ferruginous hawk and the western burrowing owl, native non-game birds including the long-billed curlew, and most reptiles and amphibians.

On the mule deer winter range depicted on Map 2-6, 80 to 120 deer, or 16 to 24 percent of the deer population using this winter range within the ES area, would be displaced and the population would subsequently be reduced.

Fisheries

In average years, the maximum development would not reduce Snake River mean flows at any river point below the resource-maintenance flows recommended by Idaho Fish and Game Department (IFG). Maximum development would reduce wetted stream perimeter (wetted cross-section) by 36 percent in a low-flow year, such as 1977, or 39 percent below the perimeter wetted by recommended flows. Maximum development would have reduced wetted perimeter by 33 percent in the average of the four lowest-flow years in the period 1968 - 1977 to a point 30 percent below the perimeter wetted by IFG recommended flows. All of these calculations are for the area below Swan Falls Dam, (see Map 2-4) the worst case in the ES area. Reductions of wetted area in other stream reaches would be less.

Quantifying terms used in the following section are defined as: very slightly - between 0 to 1 percent; slightly - between 1 and 5 percent; moderately - between 5 and 25 percent; heavily - between 25 and 100 percent.

Sturgeon

In average and low-flow years sturgeon reproduction would decline moderately; growth would decline slightly above Strike and moderately below. Survival would decrease moderately in all reaches of the ES area. Impingement and entrainment of larval white sturgeon at pump intake structures would increase the mortality of sturgeon in the ES area.

In low-water years, effects of reduced wetted perimeter in the area below Swan Falls would be especially heavy because the channel configuration

changes sharply in that area as flows decline. This would sharply reduce embryo survival and growth of all sizes of sturgeon and would increase the mortality of larval fish. It is estimated the Snake River in the ES area would support less sturgeon--probably 25-50 percent less.

Other Fish Species

A slight increase in density of benthic invertebrates would tend to increase food available for most fish, but this beneficial impact would be offset by loss of wetted area for plant and insect production. The net effect would be a decline in growth rates of fish.

Flow conditions in all years would not affect fish movements upstream or downstream.

Reservoir populations will be little affected by the development, except that in the upper end of reservoir pools there will be some increase in abundance of rooted aquatic plants and benthic algae as light penetration increases slightly. The rooted plants should provide slightly more cover for fish. The impact would disappear a few miles into the reservoir pool.

In average flow years the wetted perimeter reduction with reduced streamflow would moderately increase mortality of embryos and larvae of edge-spawners above Strike and heavily below Strike. In low-water years the effect would be heavy in all areas. Entrainment of fish at pump intake structures would add to mortality of juvenile fish. In average-flow years fish growth would decline slightly as food-producing areas are reduced. In low-water years the decline would be moderate. Growth of fish would be slightly less affected above C.J. Strike than in other reaches. Survival of all age classes would decrease moderately in all flow years and areas.

Downriver Fish

Both anadromous and resident species downstream from the ES area will be impacted very slightly by reduced summer flows as part of the nibble effect of many water withdrawals in the Columbia system.

Impact Summary

The most serious adverse effects are caused by losses in wetted perimeter in the ES reach of the Snake River. Abundance of sturgeon will eventually decline as much as 50 percent as a result of the maximum development alternative, and the mix of other fish species will shift from game fishes toward less-preferred species. Smallmouth bass, channel catfish and black crappie populations will be reduced 25 to 50 percent. Entrainment in pump intakes will contribute to the declines in desired fish species to an unknown extent. Both anadromous and resident fish species downstream from the ES area will be reduced very slightly as a result of the water withdrawals for the maximum-development alternative.

WILD HORSES

Owyhee Herd

Under the maximum development alternative, public land within the Owyhee wild horse range that would be subject to agricultural development amounts to about 5840 acres (three percent) of the total 156,600 acres used by the herd. Due to poor forage condition, lack of water, and close proximity to roads and human activity, these 5840 acres generally receive limited wild horse use in relation to the remainder of the herd range. This 5840 acre loss of herd range is not expected to impact herd size or restrict movements of the horses although new access roads associated with farm development may make the wild horse areas slightly more accessible to the public, thereby increasing the chances for harassment of the herd.

Saylor Creek Herd

Until 1983, when a Wild Horse Management Plan (refer to Chapters 1 and 2) will be completed by BLM for the Saylor Creek herd, decisions would have to be postponed as to whether or not to allow farm development under this alternative on approximately 40,800 acres (40 percent) of the estimated 103,200 acre area presently used by the herd (see Map 2-7 and Overlays 2A and 2B). The WHMP will determine optimum herd size, designate specific herd range, and provide management practices to adequately protect, maintain, and manage the herd.

Until the Saylor Creek WHMP is completed, it is not possible to predict impacts of agricultural development on the herd. As BLM is obligated by law to insure protection and management of wild horses on public land, agricultural development could be precluded in areas devoted to herd management.

CULTURAL RESOURCES

The impacts to cultural and paleontological resources resulting from the development of 176,310 acres differ from impacts of the proposed action only in a quantitative sense - the more acres developed, the more sites impacted. Development at the maximum level would impact an undetermined number of unrecorded sites and at least some of the following known sites: 65 prehistoric sites, 3 historic sites, and four additional paleontological sites. Several of the prehistoric sites are in the proposed Saylor Creek Archaeological District which has been identified as meeting National Register Criteria of eligibility. (See Appendix 1-3). No formal determination of eligibility has yet been made.

Agency procedures for mitigation are identical to those required under the proposed action: cultural and paleontological resource inventory prior to farm allowance, consultation with the State Historic Preservation Office and the Heritage Conservation and Recreation Service, comment from the National Advisory Council on Historic Preservation on National Register eligible properties, appropriate mitigation measure (salvage, avoidance, etc.) implemented. It is expected there would be no more instances requiring mitigation than under the proposed action.

Since the resource base is still largely unknown in the ES area, it is impossible to assess the cumulative effect on cultural sites of developing 176,310 acres as opposed to the effect of developing 111,015 acres (the proposed action). In addition, since cultural and paleontological sites are not evenly dispersed over the ES area, the losses incurred under maximum development would not be likely to increase proportionally and may in reality be far greater or lesser than expected. It is conceivable that the resource base would be sufficiently depleted to preclude any future regional studies in the area.

VISUAL RESOURCES

Visual impacts under the maximum development level would be similar to those discussed in Chapter 5 for the proposed action, although of a greater magnitude.

Since most of the farm and associated development would occur on VRM Class IV areas (low scenic quality), modification of the natural landscape in these Class IV areas would be considered acceptable by some people. However, several road and transmission line crossings of the Oregon Trail and Kelton Road (VRM Class I) would be necessary to facilitate farming activity. These developments would result in adverse visual impacts on these historic routes. The impact would be especially severe on the Oregon National Historic Trail (see Map 2-10).

The Snake River Canyon from Hammett east to Salmon Falls Creek Canyon are designated as BLM VRM Class II areas. Even after proper location, facility design, and site rehabilitation and landscaping, the development of irrigation pump stations and associated roads, transmission lines, and penstocks would result in visual intrusions which may exceed the BLM's visual resource contrast rating for these areas. In VRM Class II areas, any changes in the basic elements of the natural landscape should not be evident and should not attract attention. Highest visual impacts would occur where the Snake River is visible to passing motorists on Highway 30 and Interstate 80.

There would also be an unavoidable adverse visual impact resulting from concentrated ORV activities. This is especially true on smaller parcels of public land with steeper topography that are retained within the farm areas and accessible from farm access roads. Since this use would occur mostly on Visual Resource Management Class IV areas, the impact would not be severe.

RECREATION

This development level could result in the loss of 176,310 acres of public land for recreation uses. Recreation opportunities on remaining adjacent public land could also be impaired due to some access being blocked by private land, farm fences, and obliterated roads although new farm related roads would likely create about the same access opportunity that was lost.

The effect of this agricultural development level upon recreation would vary by recreational activity. The most significant impacts would be on the sightseeing, ORV use, and hunting activities.

Sightseeing

Agricultural development would have adverse impacts on the viewing and enjoyment of historic remnants of the Oregon Trail and Kelton Road. Public enjoyment of segments of the historic routes would be impaired by views of modern intrusions associated with agriculture development, primarily roads and powerline crossings. Furthermore increased road access and population growth (ranging from 981 to 1625 people - see Socio/Economic section of this alternative) associated with farm development would encourage inappropriate motorized recreation use of the historic routes and could result in historic site vandalism. Such use would decrease the quality of the historic sightseeing experience.

Irrigation works associated with farm development, namely pump sites, would degrade sightseeing qualities along the Snake River, especially within those areas visible from highways. (See Visual Resource section). Sightseeing use via boat would also be degraded by pump site developments contrasting with the natural river shoreline.

For the remainder of the ES area, farm development would have either adverse or beneficial effects on sightseeing, depending on the viewers point of view. Some find agricultural landscape pleasing, while others see greater value in desert scenery.

Off-Road Vehicle Use

An estimated 86,000 acres of land under this alternative are used by ORV enthusiasts. It is estimated that the affected acreage was used by 5,000 motorcyclists and 3,300 four-wheel drive enthusiasts during 1977.

Farm development would result in a displacement of this ORV use to other public land. This displacement along with farm associated road development and population increase could result in additional and more concentrated ORV use on nearby public land.

Hunting

The wildlife section discusses impacts on wildlife species found in the ES area. Mule deer, sage grouse, and pygmy rabbit populations would be reduced by proposed action farm development. These species are pursued by hunters. Other game species that are hunted by sportsmen in the ES area would not be affected. These are principally mountain cottontail, coyote, bobwhite quail and chukar partridge.

A number of hunted wildlife species would likely increase due to enhanced habitat conditions. These would be California quail, Hungarian partridge, mourning doves, pheasants and certain waterfowl species. As

part of this alternative about 28,000 acres of isolated tracts would be interspersed throughout the 176,310 acres of new farmland. These tracts would be managed to increase upland game bird numbers; principally pheasants. The tracts would have public access for recreational hunting. It is estimated that 28,000 acres of isolated wildlife tracts would generate 10,360 hunter days annually in the ES area (BLM Burley District 1979 survey estimates that each acre of isolated tracts equals .37 hunter days per season). This would generate \$126,392 ($\$12.20 \times 10,360$ hunter days) expended by hunters using the isolated tracts if the value for a hunter day is used from the Chapter 2 Recreation section.

It is expected that some farmers would not allow public hunting on their land and some would. Farmland open to hunting would create an additional opportunity for sportsmen. Probably, isolated tracts would offer the better combination of habitat conditions to attract pheasants during the fall hunting period, however.

Certain species of waterfowl (see Chapter 2, Wildlife) feed on grain. Farmland open to hunting could give sportsmen a chance to field hunt for ducks and geese.

Overall, public hunting access on 176,310 acres of new farmland is impossible to estimate but there would be a net hunting gain in the ES area due to the isolated tracts program, and some farms undoubtedly would be left open for sportsmen.

Rockhounding

Ten known rock collecting areas were identified within the ES area. An estimated 45 percent of these areas would be converted to privately owned farms which are often unavailable for public use, under the maximum development alternative.

If these disturbed rockhounding areas remained open to public use during those seasons when the land was not being actively farmed, a beneficial impact would occur since the vegetative removal and soil disturbance associated with farming would uncover collectable rocks.

Water Based Activities

The maximum development level impact on the Snake River fishery is expected to reduce harvestable game fish stocks (smallmouth bass, black crappie and channel catfish) from 25 - 50 percent depending on whether river flows are normal or low as in 1977 (see Fisheries section, Impact Summary). A reduction in the quality of fishery habitat would have a corresponding negative affect on fishing opportunities due to reduced fish numbers. It could be assumed that reduced sport fishing success caused by fewer fish would eventually diminish angling use of the Snake River.

Most camping and picnicking occurs along the Snake River and is associated with fishing, waterfowl hunting, and other water related activities. Therefore, any reduction of water related recreation

opportunities during low-water years would have a corresponding effect on camping and picnicking opportunities.

Irrigation withdrawals would result in little impact on boating, waterskiing, and swimming during normal water years. However, during low-water years, adverse impacts may occur on the free-flowing sections of river due to reduced water flow. No impacts are expected on the reservoirs which accommodate the majority of these activities.

Impact Summary

Farm expansion under this alternative accompanied with an increase in roads (about 470 miles, see Transportation section) and better access would likely encourage inappropriate motorized recreational use of the Oregon Trail and Kelton Road. Pump station developments on the Snake River and powerlines into farm areas would degrade scenic qualities. Farm expansion would displace about 86,000 acres of land currently used for ORV activities and force other public land to be used for this type of recreation. Views from the Oregon Trail and Kelton Road would be degraded by farm-related developments.

There would be a substantial increase in hunting opportunity in the ES area for upland game bird species, created from agricultural land use and the BLM's wildlife isolated tracts program. Fishing would be significantly impacted on the Snake River, with an estimated loss of 25 to 50 percent of game fish populations, depending on water conditions.

WILDERNESS

This alternative would result in no direct impact to wilderness resources.

Section 603 FLPMA requires that all designated Wilderness Study Areas be considered unavailable for the development of farms, utility and access corridors, and other improvements which would impair their suitability for preservation as wilderness until Congress acts on the President's recommendation as to the suitability of the areas for designation as wilderness.

Implementation of this alternative is expected to result in an increase in population of between 981 and 1,625 people within the ES market area (as described in Socio-Economics of this alternative). This increase in population could in turn result in some deterioration of wilderness characteristics within designated Wilderness Study Areas due to increased recreational use and increased particulate air pollution originating from farm projects and other developments. Control of such deterioration of wilderness characteristics is not considered feasible due to its random or dispersed nature.

A total of approximately 110 acres of land proposed for agricultural development under this alternative is located within the Wilderness Study

Areas shown on Map 2-8. Development of these areas would be deferred until completion of the wilderness review process (see Chapter I, Statutes Restricting Farm Development Under the Proposed Action).

LIVESTOCK GRAZING

Under the maximum development alternative, 235,080 acres of farms and public purpose tracts would be scattered throughout the 418,580 acres of public land within the ES area currently used for livestock grazing. Map 2-12 and Overlays 2A and 2B show the development pattern of this alternative in relation to present livestock grazing allotments.

The most significant impact under this alternative would be the elimination of livestock grazing on approximately 233,220 acres of public land. Table 8-5 shows, by allotment, the 233,220 acres to be removed from grazing use and the associated 21,545 AUMs which would be lost per year as a result.

Table 8-6 further breaks down the 233,220 acres to indicate the estimated impact to the 127 individual livestock operators. Reductions in licensed livestock grazing use similar to these preliminary estimates, would be made by the BLM with implementation of this alternative. To adjust to these reductions, each operator would have to either reduce operations accordingly, go out of business, or try to find another grazing location.

Customary trailing routes (other than reserved stock driveways shown on Map 2-12) would be lost, causing operators to have to truck their animals or take longer, less direct trailing routes.

Existing range improvements associated with livestock grazing within the ES area would no longer be able to be used effectively. The maximum development alternative would result in the loss of the use of approximately 87,085 acres of range grass seedings, 140 miles of fence-line, 18 miles of water pipeline, 9 cattleguards, 9 check dams, 8 troughs, and 4 developed springs or wells under BLM ownership, plus other privately owned range improvements. Compensation would have to be made by farm developers to the respective rancher or the BLM for fair market value of the authorized range improvements that were removed (43 CFR 4120.66c).

The scattered land pattern of development would make it difficult for operators to locate and keep track of their animals on the public land amongst the farms. Access through the ES area would be limited. Refer to Map 2-12 and Overlays 2A and 2B.

Some problems for the livestock operator may occur due to farm projects being located within and adjacent to grazing areas. Such problems that could inadvertently occur include: livestock trespassing onto farmland where fencing is inadequate or gates are left open; livestock becoming entangled in or injured by agricultural debris; and livestock ingesting toxic chemicals through careless application and use of farm pesticides or fertilizers.

TABLE 8-5

ACRES AND AUMs INCLUDED IN MAXIMUM DEVELOPMENT
ALTERNATIVE, BY ALLOTMENT

Allotment	Public Land Included In Maximum Development Alternative		Public Land Within ES Area	
	(Acres)	(AUMs)	(Acres)	(AUMs)
Graveyard Point	280	10	1,165	40
Poison Creek	120	6	450	25
French John Area	240	11	315	15
Elephant Butte	2,310	60	3,870	99
River Group	440	32	1,785	131
Reynolds Creek Group	3,150	142	4,255	239
Black Mountain Field	1,960	121	3,800	223
Oreana #1	550	15	425	123
Nahas Individual	770	25	1,460	44
Oreana #2	3,250	164	5,155	256
Fossil Butte	10,800	268	18,420	469
Oreana #3	3,440	43	4,650	52
Castle Creek, Winter	12,850	643	23,330	1,188
Battle Creek, Winter	9,020	96	11,280	120
Battle Creek, SpSuF	4,810	241	6,245	312
Tindall Northwest	16,320	1,003	24,220	1,426
Chalk Flat	240	16	445	29
Sunnyside, SpF	460	32	755	53
Hammett #1	1,360	274	9,645	2,176
Hammett #2	2,440	358	2,800	400
Hammett #3	640	67	640	67
Hammett #4	19,390	2,368	42,670	5,782
Hammett #5	900	101	900	101
Saylor Creek	<u>137,480</u>	<u>15,449</u>	<u>249,900</u>	<u>28,027</u>
TOTALS	233,220 ^{1/}	21,545	418,580	41,397

^{1/} Approximately 1,860 acres of the total 235,080 acres of public land subject to development are not presently grazed.

SOURCE: BLM Boise District grazing case files and 1940, 1959, 1962, 1965 range vegetation surveys.

TABLE 8-6

AUMS INCLUDED IN THE MAXIMUM DEVELOPMENT ALTERNATIVE AND WITHIN THE ES AREA, BY OPERATOR

(1) Operator	(2) Allotment	(3) Active Grazing Quali- fications (AUMs)	(4) AUMs Included In Maximum Action	(5) AUMs Within ES Area	(6) Total AUMs in Boise District	(7) Percent of Local Operation Included in Maximum Development (AUMs) (Col. 4 ÷ 6)
R. Adolf	Saylor Cr.	750	6	394	750	29
Arkoosh & Zidan	Saylor Cr.	2,070	599	1,087	2,070	29
E. Ascuna	Saylor Cr.	609	176	320	609	29
E. Astorquia, Est.	Saylor Cr.	3,108	899	1,630	3,108	29
J. Barinaga & Sons	Saylor Cr.	200	58	105	2,145	3
H. Bass	Reynolds Cr. Group	565	19	31	565	3
J. Bass	Reynolds Cr. Group	493	16	26	511	3
P. Batruel	Hammet #4	62	24	58	62	39
C. Berry	Saylor Cr.	2,100	607	1,102	2,100	29
A. Black	Saylor Cr.	630	182	331	2,214	8
J. Black	Battle Cr. SpSuF	1,372	25	34	2,935	11
	Saylor Cr.	1,059	306	556		
P. Black	Castle Cr. W	68	10	12	850	3
	Battle Cr. SpSuF	182	14	19		
T. Blackstock	Elephant Butte	177	39	65	1,384	3
S. D. Blackwell	Hammett #1	95	5	44	95	5
S. S. Blackwell	Hammett #4	470	142	347	511	28
W. Boston	Reynolds Cr. Group	104	3	5	104	3
R. Brailsford	Saylor Cr.	283	82	149	283	29
H. Brandau	River Group	440	8	34	482	2
	Black Mtn. Field	42	1	2		
R. Brandau	River Group	241	4	18	271	2
	Black Mtn. Field	30	1	1		
W. Brimson	Hammett #4	195	70	172	195	36
R. Bruce	Poison Cr.	172	2	10	719	1
Bruneau Cattle Co.	Battle Cr. SpSuF	5,649	104	134	6,819	2
Burghardt Co.	Cattle Cr. W	275	40	71	3,446	4
	Battle Cr. W	276	96	120		
D. Carnahan	Saylor Cr.	983	284	516	983	29
I. Carnahan	Saylor Cr.	198	57	103	198	29
Chipmunk Grazing Association	River Group	72	1	5	3,345	1
	Black Mtn. Field	877	22	40		
B. Collett	Castle Cr. W.	910	133	249	3,787	4
Coyler Cattle Co.	Battle Cr. SpSuF	3,395	62	81	4,135	1
O. Cox	Fossil Butte	93	11	19	5,170	1
	Oreana #3	2,725	24	29		
C. T. Ranch Co.	Reynolds Cr. Group	1,594	52	89	2,039	3
	Black Mtn. Field	376	9	18		
A. Curtis	River Group	93	2	8	93	2
Double Anchor Ranch	Hammett #4	404	142	347	3,616	7
	Hammett #5	1,924	101	101		
Faulkner Land & Livestock	Saylor Cr.	5,015	1,451	2,630	5,015	29
Flying Triangle Incorporated	Saylor Cr.	3,163	915	1,660	3,163	29
Glenns Ferry Grazing Assn.	Castle Cr. W.	90	13	24	5,581	1
Guery, Inc.	Saylor Cr.	250	72	131	5,038	1
Guthries Rancho Idaho	Tindall Northwest	11,501	873	1,255	23,484	4
Half Moon Ranch	Hammett #4	1,035	355	867	1,184	30
W. B. Hall	Saylor Cr.	998	289	524	998	29
Hammett Lvstck. Co.	Saylor Cr.	6,480	1,874	3,400	11,451	18
	Chalk Flat	110	1	1		
	Hammett #1	120	8	65		
	Hammett #2	55	43	48		
	Hammett #4	314	95	231		
A. Harley, Jr.	Tindall Northwest	960	73	100	960	8
Hayland Ranches	Oreana #3	465	4	5	1,050	1
E. Jaca	Reynolds Cr. Group	244	8	14	2,691	2
	Black Mtn. Field	2,198	55	100		
J. Jewett	Saylor Cr.	510	147	268	510	29
C. Johnson	Saylor Cr.	175	51	92	175	29
S. Johnson	Saylor Cr.	72	21	38	72	29
C. Johnston	River Group	293	6	22	370	2
	Black Mtn. Field	77	2	4		
G. Johnstone	Poison Cr.	250	4	15	2,449	1
L. Jolley	Saylor Cr.	435	126	228	435	29
Jones & Sandy Livestock Co.	Saylor Cr.	2,670	772	1,401	2,670	29
S. Jones	Saylor Cr.	150	43	79	150	29
Joyce Livestock Co.	Oreana #1	966	10	80	7,212	4
	Oreana #2	4,952	133	207		
	Fossil Butte	1,069	127	220		

TABLE 8-6 (Continued)

(1) Operator	(2) Allotment	(3) Active Grazing Quali- fications (AUMs)	(4) AUMs Included In Maximum Development	(5) AUMs Within ES Area	(6) Total AUMs in Boise District	(7) Percent of Local Operation Included In Maximum Development (AUMs) (Col. 4 ÷ 6)
C. Kast	Hammett #4	242	71	174	242	29
D. Keck	Saylor Cr.	800	231	420	800	29
R. Kerbs	Saylor Cr.	2,338	676	1,228	3,103	22
C. Kevan	Saylor Cr.	135	39	70	335	29
G. King	Castle Cr. W.	2,155	315	582	8,152	4
Da. Kinyon	Saylor Cr.	724	209	380	1,279	16
De. Kinyon	Saylor Cr.	949	275	498	949	29
K. Kubik	Saylor Cr.	480	139	250	480	29
D. Lahtiner	Battle Cr. SpSuF		23	28	1,224	2
S. Leguineche	Saylor Cr.	258	75	135	516	15
S. Leham	Saylor Cr.	682	197	358	682	29
B. Malmberg	River Group	90	2	7	90	2
H. Markley	Graveyard Point	113	10	40	785	1
L. Maupin	Castle Cr. W.	250	37	71	2,454	2
D. McGhehey	Chalk Flat	2,068	13	24	3,246	11
	Hammett #4	1,036	355	867		
R. McKee	Reynolds Cr. Group	81	3	5	81	4
C. McMahon	River Group	489	9	37	615	2
	Black Mtn. Field	126	3	7		
E. Miller	Saylor Cr.	904	262	474	1,784	15
Miller Land Co.	Fossil Butte	213	25	47	2,870	1
J. Mills	Hammett #4	27	10	24	27	37
R. T. Nahas	Nahas Individual	1,463	25	44	9,520	2
	Fossil Butte	861	102	178		
	Oreana #3	1,677	15	18		
J. Nettleton	Black Mtn. Field	1,133	28	51	3,304	2
	Oreana #1	525	5	43		
	Oreana #2	1,133	31	49		
9-K Ranch	Castle Cr. W.	481	70	131	2,933	2
Noh Sheep Co.	Saylor Cr.	315	91	165	1,586	6
Patterson Land & Livestock Co.	Saylor Cr.	625	181	328	625	29
E. Perkins	Saylor Cr.	2,100	607	1,102	2,100	29
R. Pershall	Elephant Butte	92	21	34	404	5
F. Phelps & Sons	Hammett #1	1,632	101	805	1,769	6
J. Potucek	Saylor Cr.	411	119	216	411	29
G. Presley	Hammett #1	1,207	74	588	1,310	6
B. Pruett	Saylor Cr.	413	120	217	413	29
M. Quintana	French John Area	38	11	15	2,383	1
R. Ring	Saylor Cr.	127	37	67	127	29
Ross Estate	Hammett #4	390	118	289	420	28
L. Rudge	Tindall Northwest	390	30	43	390	8
Russell Inc.	Hammett #4	240	71	173	392	18
Salmon Falls Sheep Co.	Saylor Cr.	1,560	451	819	1,560	29
K. Seesee	Saylor Cr.	383	111	201	383	29
C. Sellman	Battle Cr. SpSuF	325	6	6	679	5
	Tindall Northwest	354	27	28		
Mrs. T. Shenk	Saylor Cr.	8	2	4	8	29
Simplot Livestock Company	Saylor Cr.	3,048	882	1,599	17,728	5
Sliman Sheep Co.	Saylor Cr.	650	188	341	650	29
J. L. Solosabal	Saylor Cr.	1,080	312	567	1,080	29
R. Steele	Saylor Cr.	413	120	217	413	29
C. Steiner	Fossil Butte	26	3	5	2,160	1
	Castle Cr. W.	168	25	48		
B. Stephens	Hammett #3	240	67	67	240	28
Tews Angus Farms	Saylor Cr.	101	29	53	10,546	1
W. Thompkins	Reynolds Cr. Group	1,239	41	69	1,254	3
M. Thompson	Saylor Cr.	1,794	519	940	1,794	29
L. Trail	Saylor Cr.	1,005	291	527	1,005	29
2-Plus Ranches	Hammett #1	1,398	85	675	2,678	18
	Hammett #4	1,235	403	983		
Urquidi & Ocamica	Battle Cr. SpSuF	366	7	10	2,398	1
R. Viner	Hammett #4	473	166	405	539	31
W. Walker	Hammett #4	588	213	519	588	36
Wells Livestock Co.	Saylor Cr.	200	58	105	4,931	1
D. Wicher	Hammett #2	400	315	352	550	66
	Hammett #4	150	47	116		
G. Withers	Chalk Flat	333	2	4	333	1
20 Individual Operators	Sunnyside SpF	25,275	32	53	N/A	1
TOTALS		153,428	21,545	41,397		

SOURCE: BLM grazing case files and 1940, 1959, 1962, 1965 range surveys.

The total combined impacts resulting from the reduction in grazing use, scattered farm locations, and inadvertent interference of livestock operations from adjacent farm activity, would likely be severe enough to make it no longer economically nor physically feasible to graze livestock on the public land remaining amidst the farms. Because of this, in most allotments, effective grazing use would no longer be possible on most of the public land within the ES area.

Therefore, under the maximum development alternative, grazing could in effect be eliminated on up to 418,580 acres of public land rather than on just the 233,220 acres actually developed. Up to 41,397 AUMs could actually be lost among 127 operators rather than 21,545 AUMs.

Tables 8-5 and 8-6 show acres and/or AUMs of grazing use within the ES area for comparison with those strictly included in the maximum development alternative. This gives a range of the maximum and minimum losses possible to the operators under this alternative. The figures in Column 7 of Table 8-6 show that at a minimum, out of 127 livestock operators, approximately 8 would lose more than 30 percent of their local operation in the BLM Boise District; approximately 42 would lose 21-30 percent; approximately 9 would lose 11-20 percent; and approximately 68 would lose 0-10 percent.

Impact Summary

Under the maximum development alternative livestock grazing would be eliminated on approximately 233,220 acres of public land within the ES area. One hundred twenty seven individual livestock operators in 24 allotments would lose a total of approximately 21,545 AUMs grazing use per year. The use of a number of range improvements including 87,085 acres of range grass seedings, 140 miles of fenceline, 18 miles of water pipeline, 9 cattleguards, 9 check dams, 8 troughs, and 4 developed springs or wells owned by the BLM, plus other privately owned range improvements would also be lost.

Total cumulative impacts from reduced grazing use, scattered farm locations and inadvertent interference of livestock operations from adjacent farm activity would likely be severe enough to make it no longer feasible to graze livestock on much of the public land remaining in the ES area amongst the farms. Therefore, as much as 41,397 AUMs per year could actually be lost.

AGRICULTURE

The maximum development alternative would add 176,310 acres of new farms in the ES area during the 1980's. Based on the assumed crop rotation discussed in Chapter 1 and less three percent for non-crop areas, there would be 37,625 acres of potatoes, 35,914 acres of dry beans, 29,074 acres each of winter wheat, barley and sugar beets, and 10,260 acres of alfalfa grown each year as a result of the development level.

MINERAL RESOURCES

Under the maximum development alternative, road construction needs would require about 2,060,000 cubic yards of sand and gravel materials for construction of an estimated 470 miles of gravel roads. This would involve about 400 acres of land, which would be temporarily disrupted. A total area of 1937 acres would be devoted to road use, and would, for all practical purposes, be permanently removed from other uses.

With proper reclamation, any land disturbed for gravel production would be only temporarily removed from other uses.

LAND USE PLANS, CONTROLS, AND CONSTRAINTS

Impacts would be the same as for the proposed action.

TRANSPORTATION NETWORKS

The amount of land used for roads and utility transportation systems would increase over what is now in existence. Based on the agricultural development of other land in the ES area, new roads would be the single largest change in land use except for the actual agricultural development. Based on existing farm developments in this area, 470 miles of new roads (encumbering 1,937 acres) would be required to serve the proposed farm areas. From 300-400 acres of public land would be needed as a source of material for road construction (see Mineral impacts).

Utility systems would also be increased, but, as in past development, these systems generally parallel existing or new roads and offer only a visual impact to the existing environment. It is not anticipated that any new large (greater than 245 kv) power lines would be constructed in the ES area as a result of agricultural development.

SOCIO-ECONOMIC CONDITIONS

The impacts depicted in this section are generated from a combination of the highest crop prices (1976 Normalized) and the lowest energy prices to irrigators (16.5 mills) as shown in Table 3-8 (Chapter 3). These high crop prices and low energy prices would be the most favorable circumstances for farmers under the proposed action. Most other combinations of crop and energy prices illustrated in Table 3-8 do not yield positive farm profits.

The change in earnings and employment discussed in this section was analyzed with the aid of BLM's Dynamic Regional Analysis Model (DYRAM) as shown in Appendix 3-1.

Loss of ranch workers and ranch income was based on the total elimination of livestock grazing in the ES area, once farming was

completely established under the proposed action. With such circumstances, 418,580 acres of public land would be closed to livestock grazing. This would represent the worst case situation for livestock operators in the ES area.

Carey Act

The development of 176,310 acres would result in 551 farm units. At the same time 418,580 acres would be closed to livestock grazing.

The primary employment impacts would be an additional 551 farmers and a loss of 31 ranch workers. Assuming the highest crop returns and the most favorable energy costs, gains in the farm sector would create secondary impacts of an additional 105 employees in the farm sector and 131 in the remainder of the market area economy. The decrease in the livestock industry would result in 14 jobs lost. Total employment changes by industry are shown in Table 8-7. The major impacted industries are wholesale and retail trade and services. However, all the sectors of the economy would be affected.

By the year 2000 the labor force would be 70 percent higher than in 1975. This alternative would slow down the projected decrease in agricultural employment (Idaho Dept. of Water Resources 1978).

As a result of the alternative, the maximum increase in population in the market area would be 1,738. This was based on 1975 employment to total population ratios. Table 8-8 gives age breakdown for the new population.

Assuming the worst case situation and the fact that ranchers in the ES area normally use an average of 92 percent of their grazing privileges they would lose 38,085 AUMs as a result of the maximum development alternative. An AUM in the ES area is worth approximately \$10.86 in income to the ranchers. (Livestock earnings in the ES market area in 1974 totaled approximately \$34,510,000). Dividing total earnings by the total number of AUMs of forage consumed in the region yielded a per AUM average earning of \$10.86. Thus, ranchers would annually lose approximately \$414,000 in direct income.

Only the "best case" net farm profit scenario (from Chapter 3, Table 3-8) was analyzed for secondary impacts. Under this case farm income would increase \$4.7 million (\$8,520 per farm x 551 farms). The secondary impacts would increase income through all sectors of the economy. The net effect would be that all sectors, excluding livestock, would gain income as a result of this alternative. The total income impact (direct and secondary) would be a gain of \$7.9 million throughout the market area.

Implementation of this alternative would lead to an increase of approximately 498 children in the 5-17 age group. This would mean an increase of 448 new school pupils - 323 elementary and 117 high school.

TABLE 8-7
 EMPLOYMENT CHANGES, NUMBER OF JOBS
 CAREY ACT - MAXIMUM AGRICULTURAL DEVELOPMENT

Industry	Due to Primary Livestock Loss	Due to Primary Ag. Gain	Total
Agriculture			
Livestock	33	+9	24
Other Agriculture	0	+635	+635
Food and Kindred	-3	+9	+6
Wholesale & retail Trade	-3	+25	+22
Services	-1	+16	+15
Other	-5	+45	+40
TOTAL	-45	+739	+694

SOURCE: Idaho State Office, Bureau of Land Management
 Dynamic Regional Analysis Model January, 1979

TABLE 8-8
 AGE BREAKDOWN OF NEW POPULATION

<u>Age Group</u>	<u>Number</u>
5 yrs.	168
5-17 yrs.	466
18-29 yrs.	455
30-44 yrs.	317
45-64 yrs.	164
65 + yrs.	55
	<u>1,625</u>

SOURCE: Idaho State Office, BLM
 U.S. Dept. of Energy, 1978

TABLE 8-9
 CAREY ACT
 MAXIMUM AGRICULTURAL DEVELOPMENT
 LOCAL SERVICES

	Owyhee	Elmore	Twin Falls	Canyon	Area Summary
Workers	275	301	78	89	742
Population	643	704	184	207	1,738
Children					
(5-17 yrs)	184	202	52	59	498
School Children	166	182	47	53	448
Elementary	120	130	34	39	323
High School	46	51	13	15	125
Elem. Sq. Footage	14,375	15,685	4,107	4,620	38,760
H.S. Sq. Footage	6,899	7,701	1,925	2,246	18,770
Cost of School					
Construction	\$723,733	\$792,194	\$207,340	\$232,768	\$1,956,035 ^{1/}
Cost of School					
Furnishings	\$86,848	\$95,064	\$24,881	\$27,932	\$234,724
Cost of School					
Land	\$32,423	\$35,490	\$9,289	\$10,428	\$87,630
Number of					
Teachers	7	9	2	2	20
Health Care					
Personnel	7	9	2	2	20
Firemen and					
Policemen	4	5	1	2	13
Cost of Public					
Facilities	\$994,196	\$1,033,511	\$270,499	\$303,674	\$2,551,879
Total Public					
Capital Costs	\$1,829,189	\$2,002,221	\$524,038	\$588,307	\$4,943,775

SOURCE: U.S. Department of Energy 1978 and Idaho State Office, Bureau of Land Management

NOTE: Numbers may not add up to totals due to rounding.

^{1/} All dollar figures are in constant 1975 dollars

These students would require 38,760 square feet of elementary classroom space and 18,770 square feet of high school classroom space (U.S. Dept. of Energy 1978). If sufficient space were not available in the market area, it would cost roughly \$2.3 million to build the necessary space (in 1975 dollars). Table 8-9 shows how the counties would be impacted.

Total public capital costs that may be required could reach a maximum of \$4.9 million. It is anticipated that public costs would be below this figure. Under 1977 average mill levies the three counties in the ES area would receive \$2.9 million in property taxes. The counties would not obtain these revenues until the land is deeded to the applicant.

Desert Land Act

The number of acres developed into farms and the number of acres taken out of the livestock production would be the same as under the Carey Act. Due to the lack of a residency requirement under the DLA it is estimated that only 10 percent of the farms would have resident owner/operators. The remainder of the farms would have non-resident owner/operators who maintain their residence somewhere in the market area.

The primary employment impacts would be an additional 276 farmers and a loss of 31 ranch workers. Since secondary impacts are based on earnings, they would be the same as under the Carey Act. Total employment changes by industry are shown in Table 8-10. The major impacted industries are wholesale and retail trade and services. However, all the sectors of the economy would be affected.

By the year 2000 the labor force would be 70 percent higher than in 1975. This alternative would slow down the projected decrease in agricultural employment (Idaho Department of Water Resources 1978).

As a result of this alternative, the maximum increase in population in the market area would be 981. This was based on 1975 employment to total population ratios. Table 8-11 give age breakdown for the new population.

The change in earnings in the market area would be the same with the DLA as with the CA.

Implementation of this alternative via provisions of the DLA would lead to an increase of approximately 313 children in the 5-17 age group. This would mean an increase of 282 new school pupils - 203 elementary and 79 high school. These students would require 24,333 square feet of elementary classroom space and 11,866 square feet of high school classroom space (U.S. Dept. of Energy 1978). If sufficient space were not available in the market area, it would cost roughly \$1.4 million to build the necessary space (in 1975 dollars). Table 8-12 shows how the counties would be impacted. It is anticipated that public costs would be below this figure. Revenues received by the counties would be the same as with the CA.

TABLE 8-10
 EMPLOYMENT CHANGES, NUMBER OF JOBS
 DESERT LAND ACT - MAXIMUM AGRICULTURAL DEVELOPMENT

Industry	Due To Primary Livestock Loss	Due To Primary Ag. Gain	Total
Agriculture			
Livestock	-33	+9	-24
Other Agriculture	0	+360	+360
Food and Kindred	-3	+9	+6
Wholesale & Retail Trade	-3	+25	+22
Services	-1	+16	+15
Other	-5	+45	+40
Total	-45	+464	+419

Source: Idaho State Office, Bureau of Land Management, Dynamic Regional Analysis Model January 1979.

TABLE 8-11
 AGE BREAKDOWN OF NEW POPULATION

Age Group	Number
5 yrs.	102
5-17 yrs.	281
18-29 yrs.	275
30-44 yrs.	191
45-64 yrs.	99
65 + yrs.	33
	<u>981</u>

SOURCE: Idaho State Office, BLM, U.S. Department of Energy, 1978

The change in earnings in the market area would be the same with the DLA as with the CA.

TABLE 8-12
DESERT LAND ACT
LOCAL SERVICES

	Owyhee	Elmore	Twin Falls	Canyon	Area Summary
Workers	157	173	45	92	467
Population	369	403	105	216	1,093
Children					
(5-17 yrs)	106	116	30	62	313
School Children	91	104	27	56	282
Elementary	68	75	20	40	203
High School	27	29	8	16	79
Elem. Sq. Footage	8,200	8,979	2,336	4,818	24,333
H.S. Sq. Footage	3,999	4,379	1,139	2,350	11,866
Cost of School					
Construction	\$414,772	\$454,158	\$118,154	\$243,694	\$1,230,778 ^{1/}
Cost of School					
Furnishings	\$ 49,772	\$ 54,498	\$ 14,179	\$ 29,244	\$ 147,693
Cost of School					
Land	\$ 18,582	\$ 20,346	\$ 5,293	\$ 10,918	\$ 55,139
Number of					
Teachers	4	4	1	2	12
Health Care					
Personnel	4	4	1	2	12
Firemen and					
Policemen	2	3	1	1	8
Cost of Public					
Facilities	\$537,522	\$588,562	\$153,122	\$315,813	\$1,595,020
Total Public					
Capital Costs	\$1,041,341	\$1,140,222	\$296,643	\$611,827	\$3,090,033

SOURCE: U.S. Dept. of Energy 1978 and Idaho State Office, Bureau of Land Management.

NOTE: Numbers may not add up to totals due to rounding.

^{1/} All dollar figures are in constant 1975 dollars.

Social Values

Social values would be impacted the same as discussed for the proposed action in Chapter 3.

Crop Prices

The estimated effects on prices and production under this alternative would be similar to the proposed action. By 1984, the Pacific Northwest (PNW) and U.S. average potato prices would be lower by 9 and 12 cents per hundredweight (cwt), respectively (Blakeslee 1979). There would be a loss of 5.42 million cwt of production outside the PNW and 4.87 million cwt of production on pre-existing PNW farms. However, the estimated 11.85 million cwt of new production in the study area results in net increases in total PNW production of 6.98 million cwt and in total U.S. production of 1.56 million cwt (Blakeslee 1979).

The price effects are relatively minor since most of the effects take the form of displacements of production on producing units which existed prior to development in the new producing area. The exact degree of displacement depends on how rapidly the new production comes on line and on how much time is allowed for adjustment. "The displacement effect need not represent a great decline in economic well-being among those who leave or reduce potato production. This is because it is not the average producing unit which leaves under such circumstances. Rather, it is the one for which potato production was originally only a marginal choice relative to the next best economic alternative. Presumably, not much economic well-being is lost when such units take up the next best alternative rather than continue in potato production" (Blakeslee 1979).

In summary, this alternative would lower potato prices slightly (9 cents in the PNW and 12 cents in the U.S.), total production would increase (by 1.56 million cwt), and some marginal potato producers would discontinue producing potatoes and take up the next best alternative.

Impact Summary

Carey Act

Implementation of this alternative via provisions of the Carey Act would lead to increased employment by 742 jobs and an increase in population of 1,738. Total earnings could increase as much as \$7.9 million. There would be 448 more school children which would require 20 new teachers. The increased population would require 20 additional health care personnel and 13 additional firemen and policemen. The cost of required public facilities could be as much as \$2.6 million and the total public capital costs could reach \$4.9 million.

Desert Land Act

Implementation of this alternative via provisions of the Desert Land Act would lead to increased employment by 467 jobs and an increase in population of 1,093. Total earnings could increase as much as \$7.9 million. There would be 282 more school children which would require 12 new teachers. The increased population would require 12 additional health care personnel and 8 additional firemen and policemen. The cost of required public facilities could be as much as \$1.6 million and the total public capital costs could reach \$3.1 million.

Ranchers would annually lose approximately \$414,000 in direct income under both CA and DLA disposal.

ENERGY

Electrical Energy

Estimation of Electricity Use

The land in the maximum development alternative was measured according to estimated lift height and distance, and electricity consumption was estimated as described in Chapter 3. Out of approximately 138,000 acres assumed to be irrigated out of the river (see Table 1-3, Chapter 1), the median lift height and distance is 600-700 feet and 6-8 miles from the river. The approximately 38,000 acres to be irrigated out of wells were assumed to have an average of 100 feet of lift and to be located within the boundaries of the farm, i.e., "0" distance from the water source. The median of all acres, including the well-irrigated land, is 600-700 feet of lift and 4-6 miles from the water source. This median measurement is the same as for the proposed action.

Tables 8-13 and 8-14 show the maximum development electricity demand in the "average" case and "worst" case or drought years. As in Chapter 3, the "average" case is based on average weather conditions and monthly irrigation requirements. The worst case represents drought year weather conditions and irrigation requirements. Line 1 in each table shows the estimated direct consumption each month in average MW. Line 2 shows the losses of hydroelectric generation that result from diversions above Idaho Power Company (IPC) dams. Line 3 in each table shows the total load by month including the addition of a factor for line loss to the direct consumption.

In the average case year, the July load of this alternative is 307 average MW, in the worst case year the highest load occurs in June and is 389 average MW. Total load over the season would be 843,000 MWH in the average case, 1.1 million MWH in the worst case. (For further discussion of these calculations, see Appendix 8-1).

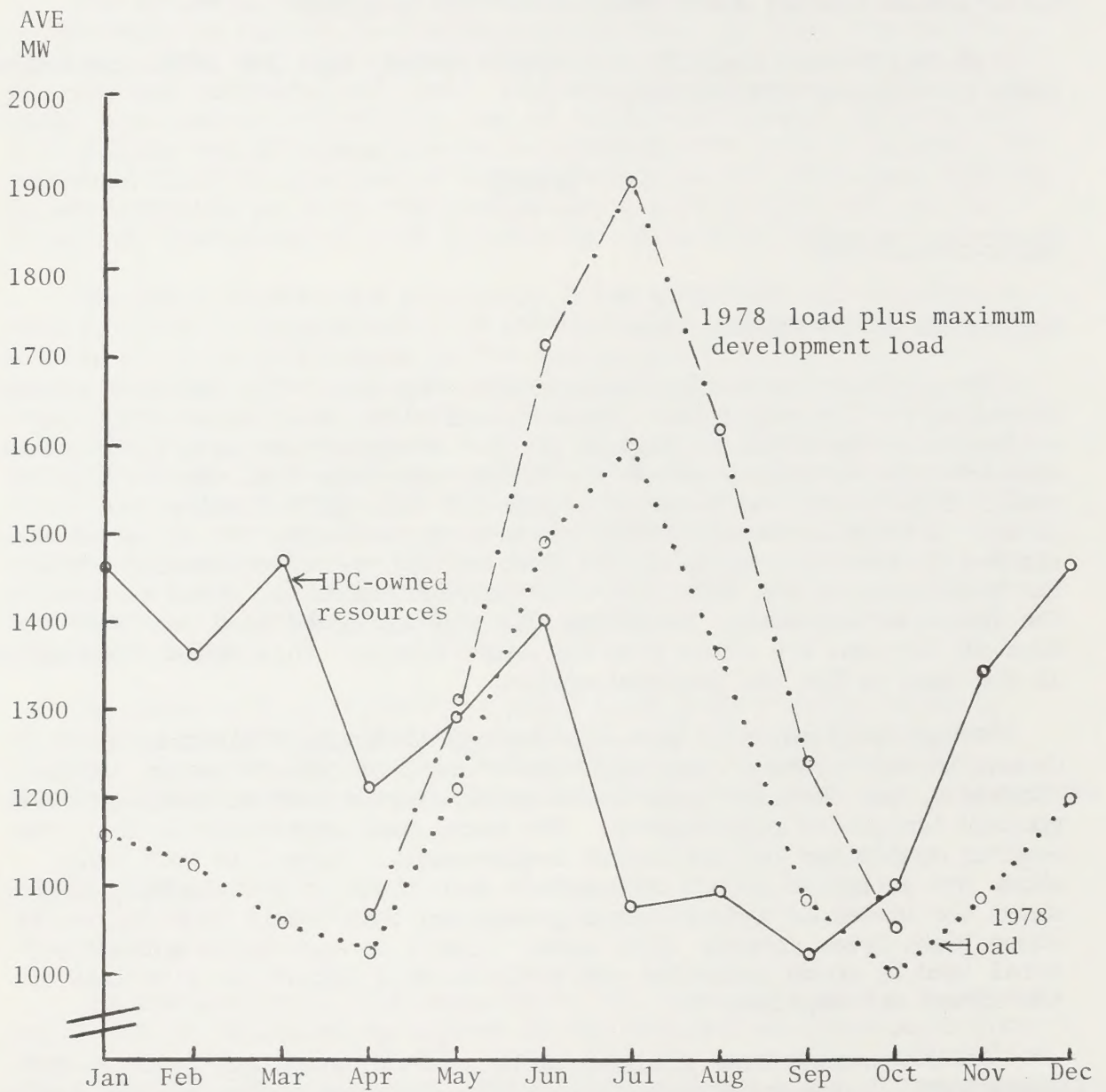


Figure 8-1
 IMPACT OF MAXIMUM DEVELOPMENT
 ON IPC RESOURCES AND LOAD
 (AVERAGE YEAR)

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

Table 8-13

ELECTRICITY CONSUMPTION BY MAXIMUM DEVELOPMENT ALTERNATIVE

(Average MW)

- Average Year -

	Apr	May	June	July	Aug	Sept	Oct	TOTAL (MWH)
Direct Consumption	29.9	75.3	176.6	202.7	156.4	92.8	23.2	555,897
Indirect Consumption (Hydro losses on IPC system)	13.3	32.1	75.5	86.0	65.9	38.8	9.5	235,857**
Total Load on IPC System *	46.0	114.4	268.5	307.5	236.8	140.2	34.9	843,395

* Total Load = Direct Consumption/.915 + Hydro Losses.

** Losses over irrigation season.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

Table 8-14

ELECTRICITY CONSUMPTION BY MAXIMUM DEVELOPMENT ALTERNATIVE

(Average MW)

- Worst Case Year -

	Apr	May	June	July	Aug	Sept.	Oct.	TOTAL (MWH)
Direct Consumption	63.0	127.0	257.3	228.7	194.1	119.7	40.7	756,137
Indirect Consumption (Hydro losses on IPC System)	26.6	54.9	107.4	103.6	77.6	48.6	16.4	319,328**
Total Load on IPC System*	95.5	193.7	388.6	353.5	289.7	179.4	60.8	1,075,465

* Total Load = Direct Consumption/.915 + Hydro Losses.
(.915 is a factor to account for line losses)

** Losses over irrigation season.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

Impacts of Load on IPC Electricity Supply and Demand

The impact the maximum development alternative would have on the current IPC system in an average year is illustrated in Figure 8-1. Figure 8-1 shows the maximum development average year demand superimposed on the 1978 company-owned resources (adjusted for median water conditions) and load. (Compare with Figure 3-8, Chapter 3).

The impacts of the maximum development alternative will be discussed in the context of the two "most likely" scenarios outlined in Chapter 3. These are: Case 1, situation "B", IPC construction of coal-fired generating capacity sufficient to cover the new peak load in an average (not drought) year, with the assumption that excess power from the new capacity will have to be sold off season to other utilities at a low price; and Case 2, IPC participation in new plants constructed by other utilities with the assumption that IPC would be able to purchase output from such plants to exactly cover its new average year load. These are considered to be "middle range" scenarios, and do not represent either maximum or minimum cost predictions. In years with loads greater than in the "average" case, additional resources would be required.

In Case 1B, 384 MW of IPC generating capacity operating at 80 percent load factor would be required to meet the July average load of maximum development. In Case 2, IPC would require 843,000 MWH of output from plants built by other utilities.

Impacts on IPC Ratepayers

The impact of new supply costs on the price of electricity to IPC ratepayers was estimated by "rolling in" the cost of new supply and new irrigation sale to the 1977 IPC operating years as described in Chapter 3. The top of Table 8-15 shows the 1977 average price for different customer classes and new average prices for the two most likely scenarios. The bottom of Table 8-15 shows the increase in annual electric bills that would occur under these scenarios for the 1977 average electricity use customer in each class.

Table 8-16 shows the impact on the IPC system as a whole. In Case 1B the annual cost of new supply is \$96.2 million per year; in Case 2, \$33.7 million per year. In Case 1B, revenue from new irrigation and revenue from off season export of power would recover \$25.4 million leaving \$70.8 million per year to be absorbed by existing IPC ratepayers. In Case 2, new irrigators would pay \$10.3 million, leaving \$23.4 million to be absorbed by ratepayers. On a per acre basis, Table 8-17, new irrigators would pay an average of \$74/year per acre in Case 1B, or \$59 per year in Case 2, leaving \$402 per acre or \$133 per acre to be absorbed by existing IPC ratepayers.

The overall impact to 1977 customers would be an increase over 1977 revenues of 47 percent in Case 1B or 16 percent in Case 2.

As described in Chapter 3, the most important energy impacts result from the effect of the increased electricity prices described above on existing IPC ratepayers.

Table 8-15

IMPACT OF MAXIMUM DEVELOPMENT ON CUSTOMER PRICES

AVERAGE PRICES (mils/KWH)	AVERAGE YEAR		IPC PARTICIPATION IN NEW PLANTS
	1977 IPC ADDS BASE	384 MW CAPACITY Situation B	
System	16.3	23.9	18.8
Irrigators	16.0	23.6	18.5
Residences	20.7	30.5	23.9
Small Commercial*	22.5	33.1	25.9
Large Commercial**	12.5	18.4	14.4

AVERAGE YEARLY INCREASE TO 1977 CUSTOMERS
(\$/year)

Irrigators***	2622	1245	410
Residences	287	136	44
Small Commercial*	2153	1016	525
Large Commercial**	136552	64540	20970

* Schedule 12

** Schedule 19

*** Corresponds roughly to the seasonal use of a 100 HP pump

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA 512-CT8-226)

Table 8-16

TOTAL COST OF MAXIMUM DEVELOPMENT TO IPC SYSTEM

(MILLION \$)	CASE	
	SITUATION B	SITUATION A
TOTAL INCREASE TO SYSTEM	96.2	53.7
REVENUE FROM MAXIMUM DEVELOPMENT	13.1	10.3
REVENUE FROM OFF-PEAK SALES	12.3	--
NET COST TO 1977 IPC SYSTEM	70.8	23.4

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

Table 8-17

PER ACRE COST OF MAXIMUM DEVELOPMENT TO IPC SYSTEM

(\$)	CASE	
	SITUATION B	SITUATION A
COST OF MAXIMUM DEVELOPMENT	547	191
REVENUE FROM MAXIMUM DEVELOPMENT	74	59
COST RECOVERED BY OFF-PEAK SALES	70	--
COST BORNE BY 1977 IPC CUSTOMERS	402	133

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226)

The average use residential customers' annual bill would rise by \$136 per year in Case 1B or \$44 per year in Case 2. As in the proposed action, impacts resulting from these increases would fall most heavily on low income households especially those with electric heat. The impact under the maximum development alternative would have a severity beyond a simple proportional increase over the impacts felt under the proposed action. Larger increases subtract more from the ability to purchase other household essentials.

The 1977 annual electric bills of the average small commercial customers (Schedule 12) would rise by \$1,016 per year in Case 1B or \$325 per year in Case 2. For the average use large commercial (Schedule 19) customers the annual increase would be \$64,540 or \$20,170.

For irrigation customers the increases for the average use would be \$1,245 per year in Case 1B or \$410 per year in Case 2. The average use corresponds roughly to the normal seasonal use of a 100 HP pump. For a typical 5,000 HP high lift pump station the increase in Case 1B would be \$68,400 per year, or \$22,500 per year in Case 2.

On a per acre basis the increases would be \$7.14 or \$2.35 for the average IPC area irrigated acre and \$19.37 or \$6.37 for an acre that required the 1977 average electricity use for high lift pumps in the area.

The impacts on existing farmers that would result from such increases in electric rates could have a severity that is more than proportionally greater than under the proposed action. Electricity costs for pumping would be increased more than 50 percent under supply scenario Case 1B. If such an increase occurred coupled with greater competition from even more commodity production, the economic pressure on existing irrigation customers could be expected to drive marginal operations, including existing high lift pumping projects, out of production. Based on the farm budgets presented in the economic section of Chapter 3, it is doubtful whether existing high lift pump irrigation could survive increases of \$20.00 per acre per year and a continuation of depressed commodity prices.

Regional Impacts

The impacts of the maximum development alternative on the Pacific Northwest (PNW) region is determined by the downstream hydro losses on the eight downstream FCRPS dams, as described in Chapter 3. Assuming a value of 617.7 KWH lost per acre foot of water diverted, the hydro losses on the federal system total 245,851 MWH and 323,663 over 12 months in the average and worst case years. Evaluated at 35 mils/KWH, those losses represent \$8.6 million in the average year and \$11.3 million in the worst case year. This amounts to a cost of \$47 and \$64 per acre of the maximum development. These costs would be in addition to those absorbed by the IPC system.

As noted in Chapter 3, however, in Case 1B, where IPC exports large quantities of cheap power, these losses would be offset by the availability of that power.

Table 8-18

ANNUAL CHEMICAL ENERGY CONSUMPTION, MAXIMUM DEVELOPMENT

	Maximum Development Consumption	Current Idaho Consumption *	Maximum Development as % of Total Idaho Consumption
Gasoline (Thou gal)	1,608	521,000	.3%
Diesel (Thou gal)	3,455	316,000	1.1%
Fertilizer (Tons)	19,154	565,793	3.4%
Pesticides (Tons)	320	3,067 **	10.4%

* From Chapter 2, Existing Chemical Environment

** Agricultural use only.

Chemical Energy

The consumption of chemical energy impacts (gasoline, diesel, pesticides and herbicides) by the maximum development alternative, based on the per acre consumption estimates shown in Table 2-23, Chapter 2, are displayed in Table 8-18.

As in the case of the proposed action, consumption of these materials would be small in relation to total Idaho consumption.

Impact Summary

Electricity supply requirements of the maximum development alternative in an "average" case year would be 842,913 MWH. This accounts for transmission and distribution line losses and for losses of hydroelectric generation. The load in July would be 307 average MW for the average year and 392 MW in June for the worst case year.

The impact of meeting this load on the price of electricity to IPC consumers was analyzed for the two "most likely" supply alternatives described in Chapter III.

In the first supply case, labelled 1B, it is assumed that IPC would construct 389 MW of new thermal generating capacity to meet the maximum development July load and export power off the system during non-peak months. In the other most likely case, Case 2, it is assumed that IPC would obtain 843,000 MWH during the summer through participation in a new thermal power plant constructed by another utility.

In Case 1B the annual cost would be \$96.2 million. Of this total, new irrigators would pay \$13.1 million, leaving \$70.8 million to be absorbed by other IPC ratepayers. In Case 2, total annual cost would be \$33.7 million with \$10.3 million paid by new irrigators with the remaining \$23.4 million to be paid by IPC ratepayers.

The resulting increases over the 1977 annual electric bills for the typical (average use) IPC customers in each class are shown below.

<u>\$/year</u>	<u>Residential</u>	<u>Small Commercial (Sched 12)</u>	<u>Large Commercial (Sched 19)</u>	<u>Irrigation (100 HP)</u>
Case 1B				
IPC adds 370 MW capacity	136	1018	64,540	1245
Case 2				
IPC participation with another utility	44	325	20,970	410

In addition to the impacts of the maximum development alternative on the price paid by IPC consumers, the irrigation diversions would result in losses of hydroelectric generation at federal dams on the Snake/Columbia river system. These losses would be 246,000 MWH in the average case year. It would cost \$8.6 million to replace this electricity from new thermal power plants.

ALTERNATIVE 2: MINIMUM FARM DEVELOPMENT

CLIMATE

Impacts would be the same as the proposed action.

AIR QUALITY

Due to the smaller amount of land to be developed under this alternative, it is expected there would be a decrease of about 75 percent from the proposed action in total suspended particulates in areas of agricultural development. It can be predicted that during periods of high winds (spring) and bare ground, dust particulate concentrations would be high and may exceed the national and state standards.

GEOLOGY AND TOPOGRAPHY

There would be no impact to geology and topography.

SOILS

Soils would be affected as described in Chapter 3, since this alternative would have farms located on Class I and II soils, as with the proposed action. Per acre impacts would be the same for this level of farm development. However, significantly less land would be involved, i.e., 28,590 acres as compared to 111,015 acres under the proposed action.

An anticipated three percent of the farm land (858 acres) will undergo irreversible soil damage as a result of roads, settling ponds and support facilities. Within these areas the entire soil profile will be altered.

Various land treatments would impact 100 percent of the area. Plowing, discing or raking on 97 percent of the 28,590 acres will damage the surface root zone and would cause compaction within the profile. Damages would be greater if these practices are done during high soil moisture conditions, especially on moderate to fine textured soils. However, rotation of row crops during summer months and small grains in the winter would tend to maintain a certain degree of soil organic matter stability provided all green manures are returned back to the soil. This would maintain the soil fertility, percolation rates, soil structure, infiltration rates and reduce potential erosion rates. Complete removal of crop stubble would deplete the soil of organic matter and cause faster soil depletion.

Soil erosion for irrigation and precipitation is estimated to be

slight at less than two tons per acre in most areas. Wind erosion during spring months, when many fields are fallow and soils dry, will cause topsoil removal from 0-15 tons per acre. Vegetative cover, organic matter and soil moisture will help prevent spring wind erosion. Good management practices would control soil erosion loss during windy periods.

WATER RESOURCES

Uses and Flows

Surface Water

This alternative level of development would require 56,000 acre-feet of water diverted from the Snake River. Flows in the Snake River at Murphy, the critical low-flow point, would be reduced by an average of 200 CFS in July. This represents a 3 percent reduction in flow for that month. There would be no noticeable change on a year-long basis, compared to present flows. The adopted minimum flow at Murphy would not be exceeded at any time.

Groundwater

Approximately 17,800 acre-feet of groundwater would be required under this alternative. The impact on existing well users is unknown. Present studies by USGS indicate there may be some lowering of water tables in the Grandview-Bruneau area. Any additional groundwater pumping would logically compound this problem. Therefore, this alternative would have an adverse impact but not of the magnitude of the proposed action.

Water Quality

Accurate and precise quantitative estimates of water quality changes caused by this alternative is not possible. Based on experience and knowledge of the personnel writing the water quality section of the ES, the following quantitative impacts are used: Very slightly - 0 to 1 percent; slightly - 1 to 5 percent; moderate - 5 to 25 percent; heavy -25 to 50 percent.

Snake River

There would be no detectable change in or below the ES area. Conductivity and nitrate would increase very slightly above Strike Pool, as would density of benthic invertebrates.

Tributary Streams

In tributary streams draining project lands there would be slightly more flow, and slightly more conductivity, nitrates, salts, and benthic

macroinvertebrates. Bacteria, total phosphorus, and toxicants would all decrease slightly, as would turbidity.

Groundwater

The impacts under this level of development would be the same as the proposed action, only they would be of much less magnitude because of the smaller acreage irrigated. It would take much longer for groundwater storage areas to fill. Perched water tables and seeps may not become apparent for many years, or they may not become evident except on a localized basis.

VEGETATION

Terrestrial

The 439,303 acres of public land within the ES area consists of approximately 275,583 acres of sagebrush/grassland, 87,085 acres of seeded grassland, 42,810 acres of salt-desert shrub/grassland, and 33,825 acres of natural grassland. Overall, the current vegetation is in relatively poor range condition.

The major impact to terrestrial vegetation would be the replacement of rangeland with cultivated farmland. Approximately 8,012 acres of sagebrush/grassland, 4,363 acres of seeded grassland, 10,017 acres of salt-desert shrub/grassland, and 6,198 acres of natural grassland would be cleared. These 28,590 acres would be replaced by approximately 6,102 acres of potatoes, 5,824 acres of dry beans, 4,714 acres each of winter wheat, barley, and sugar beets, 1,664 acres of alfalfa, and 858 acres devoted to non-crop land uses (based upon predicted crop rotations).

An additional 9,530 acres of public land would be reserved as public purpose tracts. Of this, up to 5,388 acres would be subject to clearing as needed for facilities in support of farm development.

Riparian

Some increase in riparian growth can be expected in tributaries, stimulated by increased nutrients in the water and by increased flow volume from infiltrated irrigation water reaching low lying drainage channels.

Aquatic

Phytoplankton, attached benthic algae, and rooted aquatic plants would increase very slightly above C.J. Strike Reservoir. In tributary streams, attached benthic algae would increase slightly to moderately.

Threatened and Endangered Plants

As shown on Table 8-4, none of the sites of the 5 plants considered as threatened or endangered within the ES area occur within the minimum development areas. If future studies locate new sites that would be within these areas however, they would be protected and preserved as required in the Endangered Species Act of 1973.

WILDLIFE

Terrestrial

This development alternative decreases the amount of land for farming by approximately 73 percent when compared to the proposed action. For this reason adverse impacts to wildlife resulting from loss of native range habitat would be substantially reduced under this alternative. Specifically 20,866 acres of the shrub/grassland and 12,254 acres of the grassland habitat types would be lost (28,590 acres for farms and up to 5,000 acres for public purpose tracts other than wildlife leave areas). The amount of human disturbance to wildlife and the effect of pesticide and herbicide use would also decrease under this alternative, both acting to lessen the adverse impacts to wildlife as compared to the proposed action.

As was the case in the proposed action, agricultural development would be beneficial to certain wildlife species. Some wildlife expected to benefit (as evidenced by increased numbers) include: ring-necked pheasant, California quail, Hungarian partridge, and various waterfowl. Under this alternative, BLM would set aside about 4,500 acres of isolated wildlife tracts among the 28,590 acres of new farmland. The selection criteria BLM would use is discussed in Appendix 1-1. These isolated tracts would provide year-round habitat for upland game birds. They would be primarily used by pheasants during winter and spring periods for shelter, feeding, and nesting when adjacent farmland is not useable for these needs.

Specific impacts resulting from this alternative that differ from the proposed action, Chapter 3, are discussed below.

Mule Deer

This alternative proposes no agricultural development within or adjacent to the mule deer winter range shown on Map 2-6. For this reason deer using this area would not be affected as discussed in Chapter 3. Beneficial impacts to mule deer existing throughout the ES area resulting from increased agriculture would be the same as those discussed in Chapter 3.

Non-game

As pointed out in Chapter 3 adverse impacts to non-game wildlife

would result from loss of the shrub/grassland or grassland habitat types. About 33,000 acres of the native range habitat would be lost due to development. This would cause a slight reduction in non-game wildlife, but as pointed out earlier this impact would be much reduced as compared to the 111,015 acres of proposed development discussed in Chapter 3.

Birds

Sage Grouse: Under this alternative no sage grouse strutting grounds or wintering areas would be lost to agricultural development. For this reason impacts to these birds posed by this alternative would be insignificant.

Raptors: Loss of native hunting habitat and the effect of human disturbance would impact birds of prey as discussed in Chapter 3. Although, as pointed out earlier, these impacts would be significantly reduced by this minimum development alternative. The amount of farmland proposed by this alternative is quite small in relation to the total acreage of the ES area (approximately 7 percent of the total area). This small amount of "new habitat" could be of value to some raptors by creating an increased edge effect and by offering increased numbers of different prey species (such as upland game birds). Raptors benefiting by this "new habitat" include: shorteared owls, marsh hawks, rough-legged hawks, and red-tailed hawks.

Other Species

Brought out in all previous chapters is the fact that habitat destruction (via agricultural development) would adversely impact native wildlife species. Loss of this habitat cannot be mitigated. Mammals significantly impacted by habitat loss include: pygmy rabbits, black-tailed jackrabbits, and various rodents, an important food source to many predators. Non-game birds likewise impacted by habitat loss include: sage sparrows, sage thrashers, vesper sparrows, black-throated sparrows, and lark sparrows.

Land conversion resulting in habitat loss for black-tailed jackrabbits, various rodents, birds, and reptiles would be an important secondary adverse impact to birds of prey. This would result in a significant reduction of raptor food sources. This could cause population decreases for all raptor species.

The adverse effect of human disturbance cannot be mitigated and would result in a adverse impact to those wildlife species which are sensitive to this type of interaction.

Sensitive Species

Ferruginous Hawk: As discussed in Chapter 3 a certain number of ferruginous hawk nests would be affected by increased agricultural

development. The number of nests impacted under this alternative would decrease from 32 (under proposed action, Chapter 3) to 22. These nests would be adversely impacted primarily due to increased human disturbance (as a result of increased agricultural development) in immediate vicinity of the nest. The result would be decreased productivity.

Western Burrowing Owl: The number of nests lost by destruction due to agricultural development would be the same as the proposed action under this alternative. The amount of hunting habitat lost and the effect of human disturbance would be much reduced by this alternative (relative to the proposed action) and for this reason the magnitude of burrowing owl loss would be significantly reduced.

Long-billed Curlew: Under this alternative the same amount of land is proposed for farm development with each of the three curlew nesting areas as is considered by the proposed action. For this reason impacts to this bird would be the same under this alternative as discussed in Chapter 3.

The sensitive species survey mitigation discussed in Chapter 4 would only be partially effective. Sensitive species impacted by the proposed action are the ferruginous hawk, long-billed curlew, and the burrowing owl. Population declines of these animals would be expected. Since there is a great deal of difficulty in determining their special requirement or foraging area, nesting sites would be located and protected but some feeding ranges could not be saved.

Impacts Summary

This alternative would allow 20,866 acres of the shrub/grassland habitat type and up to 12,254 acres of the grassland habitat type to be lost. This would result in a small amount of habitat alteration and decreased adverse impacts to native wildlife when compared to the proposed action. Wildlife species adapted to agricultural land would show population increases due to new production of this type of habitat (pheasants, Hungarian partridge, quail).

Under this alternative there would be no impact to mule deer using the mule deer wintering area depicted on Map 2-6. Likewise, sage grouse would lose no strutting grounds and sage grouse wintering areas would not be affected.

When compared to the proposed action impacts to the western burrowing owl would be similar. The burrowing owl would lose five of the nine known active burrow sites in the ES area (this is the same number lost under the proposed action). In contrast loss of burrowing owl hunting habitat and the affect of human disturbance would be significantly reduced relative to the proposed action. Impacts to the long-billed curlew would be the same under this alternative as described under the proposed action (a loss of 10 to 15 breeding pairs leading to significantly reduced production in the ES area).

The number of ferruginous hawk nests impacted under this alternative would decrease from 32 (under the proposed action) to 22. In addition there would be a significant reduction in the amount of hunting habitat lost by this bird as well as all other raptor species occurring in the ES area.

As discussed in Chapter 5, sensitive species mitigation would not be 100 percent effective, and for this reason residual adverse impacts to ferruginous hawks, western burrowing owls, and long-billed curlew would exist.

No threatened or endangered species would be effected.

Fisheries

Wetted perimeter would be reduced only about 6 percent in the worst case at Murphy in low-flow years. In areas above Swan Falls the impact of minimum development would be extremely difficult to detect in fish populations of all types. Below Swan Falls the effects would be very slight. Sturgeon abundance, growth, mortality, and reproduction would not change detectably from present levels. Abundance, growth and mortality of other fish species would not change detectably as a result of this project.

WILD HORSES

Owyhee Herd

Public land within the Owyhee wild horse range that would be subject to development would amount to approximately 2,760 acres (2 percent) of the total 156,600 acres used by the herd (see Map 2-7 and Overlays 3A and 3B). These 2,760 acres generally receive limited wild horse use in comparison with the remaining herd range due to poor forage condition, lack of water, and close proximity to roads and human activity. This 2,760 acre reduction in range is not expected to adversely affect herd size or restrict the horses in any way.

Saylor Creek Herd

Until the Wild Horse Management Plan for the Saylor Creek herd is completed in 1983 (refer to Chapters 1 and 2), decisions would have to be postponed as to whether or not to allow farm development under this alternative on approximately 3,040 acres (3 percent) of the estimated 103,200 acre area presently used by the herd (see Map 2-7 and Overlays 3A and 3B). The WHMP will determine optimum herd size, designate specific herd range, and provide management practices to adequately protect, maintain, and manage the herd under the multiple use concept. It can be assumed that impacts on the Saylor Creek herd would be very slight, due to the small acreage in the herd range that would be farmed under this alternative.

CULTURAL RESOURCES

Development of 28,590 acres would result in impacts similar to those of the proposed action, the primary difference being in numbers of sites impacted. Fewer sites, representing a smaller percentage of the resource base, would be destroyed under this alternative than under the proposed action or the maximum level of development. In addition to unrecorded sites, an undetermined number of the following known sites would be impacted by development: nine prehistoric sites, three historic sites, one paleontological site. Several of the prehistoric sites are in the proposed Saylor Creek Archaeological District which has been identified as meeting National Register criteria of eligibility. (See Appendix 1-3). No formal determination of eligibility has yet been made.

Agency procedures for mitigation are identical to those required under the proposed action: cultural and paleontological resource inventory prior to farm allowance, consultation with the State Historic Preservation Office and the Heritage Conservation and Recreation Service, comment from the National Advisory Council on Historic Preservation on National Register eligible properties, appropriate mitigation measures (salvage, avoidance, etc.) implemented. It is expected there would be fewer instances requiring mitigation than under the proposed action.

Since the resource base is still largely unknown in the ES area, it is difficult to predict how many sites would be impacted by this level of development. One must consider that these 28,590 acres were selected because they are 500 feet or less above the Snake River. In the absence of adequate inventory data, one cannot predict how the density and nature of sites change above and below this contour interval (or if in fact this occurs).

VISUAL RESOURCES

Since most of the 28,590 acres of farm development would occur on VRM Class IV areas (low scenic quality), modification of the natural landscape in these Class IV areas would be considered acceptable by many people. However, some road and powerline crossings of 4 miles of Oregon Trail and one mile of Kelton Road (VRM Class I) would be necessary to facilitate farming activity. These developments would result in adverse visual impacts on these historic routes.

The Snake River Canyon from Hammett east to Salmon Falls Creek is designated as a BLM VRM Class II. Even after proper location, facility design, and site rehabilitation and landscaping, the development of irrigation pump stations and associated roads, powerlines, and penstocks would result in visual intrusions which may exceed the BLM's visual resource contrast rating for this area. In VRM Class II areas, any changes in the basic elements of the natural landscape should not be evident and should not attract attention. Highest visual impacts would

occur where the Snake River is visible to passing motorists on Highway 30 and Interstate 80.

RECREATION

Road, canal and powerline crossings of four miles of Oregon Trail and one mile of Kelton Road routes would reduce the recreation enjoyment of these historic locations. Sightseeing enjoyment of the Snake River Canyon near Interstate 80 and Highway 30 would be reduced by the construction of river pump stations associated with farm development.

About 20,000 acres of public land currently used by ORV enthusiasts, would be converted to farms under the minimum development alternative. This would force increased ORV use on other ORV areas and put more pressure on remaining public land near the ES area.

There would be an increased public hunting opportunity, primarily for pheasants. Under this alternative, BLM would establish about 4,500 acres of wildlife leave tracts that would be open for public hunting. The tracts would be managed to increase upland game bird numbers. It is estimated that 4,500 acres of wildlife tracts would generate 1,665 hunter days annually in the ES area (BLM Burley District 1979 survey estimates that each acre of isolated tract equals .36 hunter days per season). This would generate about \$20,313 ($\$12.20 \times 1,665$ hunter days) expended by hunters if the value for a hunter day is used from Chapter 2 Recreation section. In addition it is expected that some farmers would allow public hunting on their farms. Overall, there would be a net hunting gain in the ES area.

WILDERNESS

This alternative would result in no direct impact to wilderness resources.

Section 603 FLPMA requires that all designated Wilderness Study Areas be considered unavailable to the development of farms, utility and access corridors, and other improvements which would impair their suitability for preservation as wilderness until Congress acts on the President's recommendation as to the suitability of the areas for designation of wilderness. No lands located within Wilderness Study Areas are proposed for agricultural development under this alternative.

Implementation of this alternative is expected to result in an increase in population of between 169 and 272 people within the ES market area (as described in Socio-Economics section of this alternative). This increase in population could in turn result in some slight deterioration of wilderness characteristics within designated Wilderness Study Areas due to increased recreational use and increased particulate air pollution originating from farm projects and other developments. Control of such deterioration of wilderness characteristics is not considered feasible due to its random or dispersed nature.

LIVESTOCK GRAZING

There would be 38,120 acres developed within the 418,580 acres of public land in the ES area currently used for livestock grazing. Map 2-12 and Overlays 3A and 3B show the development pattern of this alternative in relation to present livestock grazing allotments.

The most significant impact under this alternative would be the elimination of livestock grazing on approximately 37,080 acres of public land. Table 8-19 shows, by allotment, the 37,080 acres to be removed from grazing use and the respective 3,515 AUMs which would be lost per year as a result.

Table 8-20 further breaks down the 3,515 AUMs to indicate the approximate impact to the 127 livestock operators within the ES area. Reductions in licensed grazing use similar to these preliminary estimates would be made by the BLM with implementation of this alternative.

There would be a loss of the use of range improvements associated with livestock grazing on the land subject to be developed. This would include approximately 4,365 acres of grass seedings, 22 miles of fence-line, 1 mile of water pipeline, 2 cattleguards, and 1 water trough owned by BLM, plus other privately owned improvements. Compensation would have to be made by farm developers to the respective rancher or the BLM for fair market value of the authorized range improvements that were removed (43 CFR 4120.66c).

A limited number of customary grazing areas and trailing routes would be lost. Access to remaining public land would be only slightly restricted.

Some problems for the livestock operator may occur due to farm projects being located adjacent to grazing areas. Some problems that could inadvertently occur include: livestock trespassing onto farmland where fencing is inadequate or gates are left open; livestock becoming entangled or injured by agricultural debris; and livestock ingesting toxic chemicals through careless application and use of farm pesticides or fertilizers.

Table 8-20 gives an indication of the impact of the minimum development alternative on individual operations. Column 7 of this table shows approximate percentages of local operations that would be lost. Out of 127 operators, approximately 3 would lose 6-15 percent of their local operation in the BLM Boise District, and 124 would lose only 0-5 percent.

Livestock grazing would be eliminated on approximately 37,080 acres of public land. One hundred twenty seven livestock operators would lose a total of approximately 3,515 AUMs grazing use per year as a result. This would amount to a reduction in local operations of only 5 percent or less for nearly all operators.

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TABLE 8-19

ACRES AND AUMS INCLUDED IN MINIMUM DEVELOPMENT ALTERNATIVE, BY ALLOTMENT

Allotment	Public Land Included In Minimum Development Alternative	
	(Acres)	(AUMS)
Graveyard Point	0	0
Poison Creek	0	0
French John Area	0	0
Elephant Butte	1,220	13
River Group	420	30
Reynolds Creek Group	2,390	106
Black Mountain Field	1,080	77
Oreana #1	0	0
Nahas Individual	0	0
Oreana #2	0	0
Fossil Butte	120	4
Oreana #3	1,410	16
Castle Creek, Winter	4,120	206
Battle Creek, Winter	1,160	12
Battle Creek, SpSuF	520	26
Tindall Northwest	3,760	238
Chalk Flat	140	9
Sunnyside, SpF	460	32
Hammett #1	0	0
Hammett #2	340	38
Hammett #3	320	27
Hammett #4	860	137
Hammett #5	0	0
Saylor Creek	<u>18,760</u>	<u>2,544</u>
Totals	37,080 <u>1/</u>	3,515

1/ Approximately 1,040 acres of the total 38,120 acres of public land subject to development are not primarily grazed.

SOURCE: BLM Boise District grazing case files and 1940, 1959, 1962, 1965 range vegetation surveys.

TABLE 8-20

AUMS INCLUDED IN THE MINIMUM DEVELOPMENT ALTERNATIVE, BY OPERATOR

(1) Operator	(2) Allotment	(3) Active Grazing Qualifications (AUMs)	(4) AUMs Included In Minimum Development	(5) Total AUMs in Boise District	(6) Percent of Local Operation Included In Minimum Development (AUMs) (Col. 4 ÷ Col. 5)
R. Adolf	Saylor Cr.	750	36	750	5
Arkoosh & Zidan	Saylor Cr.	2,070	99	2,070	5
E. Ascuena	Saylor Cr.	609	29	609	5
E. Astorquia, Est.	Saylor Cr.	3,108	148	3,108	5
J. Barinaga & Sons	Saylor Cr.	200	9	2,145	<1
H. Bass	Reynolds Cr. Group	565	14	565	2
J. Bass	Reynolds Cr. Group	493	12	511	2
P. Batruel	Hammett #4	62	1	62	2
C. Berry	Saylor Cr.	2,100	100	2,100	5
A. Black	Saylor Cr.	630	30	2,214	1
J. Black	Battle Cr. SpSuF	1,372	3	2,935	2
	Saylor Cr.	1,059	50		
P. Black	Castle Cr. W	68	3	850	1
	Battle Cr. SpSuF	782	1		
T. Blackstock	Elephant Butte	177	9	1,384	1
S.D. Blackwell	Hammett #1	95	0	95	0
S.S. Blackwell	Hammett #4	470	8	511	2
W. Boston	Reynolds Cr. Group	104	3	104	3
R. Brailsford	Saylor Cr.	283	13	283	5
H. Brandau	River Group	440	8	482	2
	Black Mtn. Field	42	1		
R. Brandau	River Group	241	4	271	2
	Black Mtn. Field	30	0		
W. Brinson	Hammett #4	195	4	195	2
R. Bruce	Poison Cr.	172	0	719	0
Bruneau Cattle Co.	Battle Cr. SpSuF	5,649	11	6,819	<1
Burghardt Co.	Castle Cr. W	275	13	3,446	1
	Battle Cr. W	276	12		
D. Carnahan	Saylor Cr.	983	47	983	5
I. Carnahan	Saylor Cr.	198	9	198	5
Chipmunk Grazing Association	River Group	72	1	3,345	<1
	Black Mtn. Field	877	14		
B. Collett	Castle Cr. W	910	43	3,787	1
Colyer Cattle Co.	Battle Cr. SpSuF	3,395	7	4,135	1
O. Cox	Fossil Butte	93	0	5,170	1
	Oreana #3	2,725	9		
C. T. Ranch Co.	Reynolds Cr. Group	1,594	39	2,039	2
	Black Mtn. Field	376	6		
A. Curtis	River Group	93	2	93	2
Double Anchor Ranch	Hammett #4	404	8	3,616	<1
	Hammett #5	1,924	0		
Faulkner Land & Livestock	Saylor Cr.	5,015	239	5,015	5
Flying Triangle Inc.	Saylor Cr.	3,163	151	3,163	5
Glenns Ferry Grazing Association	Castle Cr. W	90	4	5,581	<1
Guery, Inc.	Saylor Cr.	250	12	5,038	<1
Guthries Rancho Idaho	Tindall Northwest	11,501	201	23,484	1
Half Moon Ranch	Hammett #4	1,035	21	1,184	2
W. B. Hall	Saylor Cr.	998	48	998	5
Hammett Lvstk. Co.	Saylor Cr.	6,480	309	11,451	3
	Chalk Flat	110	0		
	Hammett #1	120	0		
	Hammett #2	55	5		
	Hammett #4	314	5		
A. Harley, Jr.	Tindall Northwest	960	17	960	2
Hayland Ranches	Oreana #3	465	1	1,050	<1
E. Jaca	Reynolds Cr. Group	244	6	2,691	2
	Black Mtn. Field	2,198	35		
J. Jewett	Saylor Cr.	510	24	510	5
C. Johnson	Saylor Cr.	175	8	175	5
S. Johnson	Saylor Cr.	72	3	72	5
C. Johnston	River Group	293	5	370	2
	Black Mtn. Field	77	1		
G. Johnstone	Poison Cr.	250	0	2,449	0
L. Jolley	Saylor Cr.	435	21	435	5
Jones & Sandy Lvstk.	Saylor Cr.	2,670	127	2,670	5
S. Jones	Saylor Cr.	150	7	150	5
Joyce Livestock Co.	Oreana #1	966	0	7,212	<1
	Oreana #2	4,952	0		
	Fossil Butte	1,069	2		
C. Kast	Hammett #4	242	4	242	2
D. Keck	Saylor Cr.	800	38	800	5

TABLE 8-20 (continued)

(1)	(2)	(3)	(4)	(5)	(6)
Operator	Allotment	Active Grazing Qualifications (AUMs)	AUMs Included In Minimum Development	Total AUMs in Boise District	Percent of Local Operation Included In Minimum Development (AUMs) (Col. 4 ÷ Col. 5)
R. Kerbs	Saylor Cr.	2,338	111	3,103	4
C. Kevan	Saylor Cr.	135	6	135	5
G. King	Castle Cr. W	2,155	101	8,152	1
Da. Kinyon	Saylor Cr.	724	35	1,279	3
De. Kinyon	Saylor Cr.	949	45	949	5
H. Kubik	Saylor Cr.	480	23	480	5
D. Lahtiner	Battle Cr. SpSuF	1,224	2	1,224	<1
S. Leguineche	Saylor Cr.	258	12	516	2
S. Lehmann	Saylor Cr.	682	33	682	5
B. Malmberg	River Group	90	2	90	2
H. Markley	Graveyard Point	113	0	785	0
L. Maupin	Castle Cr. W	250	12	2,454	1
D. McGhehey	Chalk Flat	2,068	7	3,246	1
	Hammett #4	1,036	21		
R. McKee	Reynolds Cr. Group	81	2	81	3
C. McMahon	River Group	489	8	615	2
	Black Mtn. Field	126	2		
E. Miller	Saylor Cr.	904	43	1,784	2
Miller Land Co.	Fossil Butte	213	0	2,870	0
J. Mills	Hammett #4	27	1	27	4
R. T. Nahas	Nahas Individual	1,463	0	9,520	<1
	Fossil Butte	861	2		
	Oreana #3	1,677	6		
J. Nettleton	Black Mtn. Field	1,133	18	3,304	1
	Oreana #1	525	0		
	Oreana #2	1,133	0		
9-K Ranch	Castle Cr. W	481	22	2,933	1
Noh Sheep Co.	Saylor Cr.	315	15	1,586	1
Patterson Land & Livestock Co.	Saylor Cr.	625	30	625	5
E. Perkins	Saylor Cr.	2,100	100	2,100	5
R. Pershall	Elephant Butte	92	4	404	1
F. Phelps & Sons	Hammett #1	1,632	0	1,769	0
J. Potucek	Saylor Cr.	411	20	411	5
G. Presley	Hammett #1	1,207	0	1,310	0
B. Pruettt	Saylor Cr.	413	20	413	5
M. Quintana	French John Area	38	0	2,383	0
R. Ring	Saylor Cr.	127	6	127	5
R. Ross Estate	Hammett #4	390	7	420	2
L. Rudge	Tindall Northwest	390	7	390	2
Russell Inc.	Hammett #4	240	4	392	1
Salmon Falls Sheep Co.	Saylor Cr.	1,560	74	1,560	5
K. Seese	Saylor Cr.	383	18	383	5
C. Sellman	Battle Cr. SpSuF	325	1	679	1
	Tindall Northwest	354	7		
Mr. T. Shenk	Saylor Cr.	8	1	8	13
Simplot Livestock Co.	Saylor Cr.	3,048	145	17,728	1
Sliman Sheep Co.	Saylor Cr.	650	31	650	5
J. L. Solosabal	Saylor Cr.	1,080	51	1,080	5
R. Steele	Saylor Cr.	413	20	413	5
C. Steiner	Fossil Butte	26	0	2,160	<1
	Castle Cr. W	168	8		
B. Stephens	Hammett #3	240	27	240	11
Tows Angus Farms	Saylor Cr.	101	5	10,546	<1
W. Thompkins	Reynolds Cr. Group	1,239	30	1,254	2
M. Thompson	Saylor Cr.	1,794	85	1,794	2
L. Trail	Saylor Cr.	1,005	15	1,005	5
2-Plus Ranches	Hammett #1	1,398	0	2,678	2
	Hammett #4	1,235	23		
Urquidi & Ocamica	Battle Cr. SpSuF	366	1	2,398	1
R. Viner	Hammett #4	473	10	539	2
W. Walker	Hammett #4	588	12	588	2
Wells Livestock Co.	Saylor Cr.	200	10	4,931	1
D. Wicher	Hammett #2	400	33	550	6
	Hammett #4	150	3		
G. Withers	Chalk Flat	333	1	333	1
20 Individual Operators	Sunnyside SpF	25,275	32	N/A	1
TOTALS		153,428	3,515		

SOURCE: BIM grazing case files and 1940, 1959, 1962, 1965 range surveys.

AGRICULTURE

There would be 28,590 acres of new farms added to the ES area during the 1980's. Based on the assumed crop rotation discussed in Chapter 1 and less three percent for non-crop areas there would be 6,102 acres of potatoes, 5,824 acres of dry beans, 4,714 acres each of winter wheat, barley and sugar beets, and 1,664 acres of alfalfa grown each year as a result of this development level.

MINERAL RESOURCES

Sand and gravel needs for road construction would involve 330,000 cubic yards, or approximately 50 to 70 acres of land disturbed.

LAND USE PLANS, CONTROLS, AND CONSTRAINTS

Impacts would be the same as the proposed action.

TRANSPORTATION NETWORKS

Based on existing farm developments in the ES area about 76 miles of new gravel roads throughout farm project areas would be needed. About 313 acres would be devoted to road right-of-ways and most powerlines would be built parallel to roads. It is not anticipated that any new large (greater than 245 kv) lines would be constructed in the ES area as a result of agriculture development.

SOCIO-ECONOMICS

The impacts depicted in this section are generated from an average of the highest crop prices (1976 Normalized) and the average energy price to irrigators (16.6 mils) of the two most likely electric energy generation scenarios predicted in the Energy section of this alternative (see Table 8-21). In addition, the budget item for annual pumping system cost (see Appendix 3-2) was reduced in half to allow for the requirements of less powerful pumps, less penstock pipe, etc., due to lower lift and shorter pumping distances under this alternative.

The change in earnings and employment discussed in this section was analyzed with the aid of BLM's Dynamic Regional Analysis Model (DYRAM) as shown in Appendix 3-1.

Carey Act

The development of 28,590 acres would result in 89 farms. At the same time 37,080 acres would be closed to livestock grazing.

The primary employment impacts would be an additional 89 farmers

TABLE 8-21

NET FARM INCOME & INCOME PER ACRE
FOR A 320 ACRE FARM 1/
MINIMUM DEVELOPMENT

Energy Prices Crop Prices	IPC Participation New Plants (16.3 mills)	IPC Adds 43 MW Capacity (17.0 mills)	Average (16.65 mills)	
1976 Normalized	Net Farm Income	+\$34,990.27	+\$34,569.72	+\$34,779.99
	Income Per Acre	+\$ 112.87	+\$ 111.52	+\$ 112.19
1977 Normalized	Net Farm Income	+\$17,466.61	+\$17,046.06	+\$17,256.33
	Income Per Acre	+\$ 56.34	+\$ 54.99	+\$ 55.67
1977 Actual	Net Farm Income	-\$ 1,532.76	-\$ 1,953.31	-\$ 1,743.04
	Income Per Acre	-\$ 4.94	-\$ 6.30	-\$ 5.62

1/ Average locations of Farm under Minimum Development Alternative, i.e., 350 feet above the Snake River and 0-2 miles pumping distance.

SOURCE: Idaho State Office, BLM, 1979.

and a loss of 3 ranch workers. Gains in the farm sector would create secondary impacts of an additional 64 employees in the farm sector and 80 in the remainder of the market area economy. The decrease in the livestock industry would result in 1 more job lost. Total employment changes by industry are shown in Table 8-22. The major impacted industries are wholesale and retail trade and services.

By the year 2000 the labor force would be 69 percent higher than in 1975. This alternative would slow down the projected decrease in agricultural employment (Idaho Department of Water Resources 1978).

As a result of this alternative the maximum increase in population in the market area would be 537. This was based on 1975 employment to total population ratios.

The age breakdown of the new population is described in Table 8-23.

TABLE 8-22
EMPLOYMENT CHANGES, NUMBER OF JOBS
CAREY ACT

<u>Industry</u>	<u>Due to Primary Livestock Loss</u>	<u>Due to Primary Primary Ag. Gain</u>	<u>Total</u>
Agriculture			
Livestock	-3	+7	+4
Other Agriculture	0	+153	+153
Contract Construction	0	+6	+6
Food and Kindred	0	+7	+7
Transportation & Communications	0	+7	+7
Wholesale and Retail Trade	0	+20	+20
Services	0	+12	+12
Other	-1	+21	+20
Total	-4	+233	+229

SOURCE: Idaho State Office, Bureau of Land Management, Dynamic Regional Analysis Model, January 1979

TABLE 8-23
AGE BREAKDOWN OF NEW POPULATION

<u>Age Group</u>	<u>Number</u>
5 yrs.	55
5-17 yrs.	155
18-29 yrs.	151
30-44 yrs.	105
45-64 yrs.	54
65 + yrs.	<u>17</u>
	537

SOURCE: Idaho State Office, Bureau of Land Management, U.S. Department of Energy, 1978

Farm income would initially increase \$2.9 million (\$32,090 per farm x 89 farms). Ranchers in the ES area would lose 3,324 AUMs as a result of this alternative, considering 92 percent of the total AUMs licensed are actually used. An AUM in the ES area is worth \$10.86 in income to the ranchers. Thus, ranchers would lose approximately \$26,000 annually.

The secondary impact would increase income through all sectors of the economy. The total income impact (direct and secondary) would then be a gain of \$5.1 million throughout the market area.

Implementation of this alternative would lead to an increase of approximately 155 children in the 5-17 age group. This would mean an increase of 139 new school pupils - 100 elementary and 39 high school. These students would require 12,018 square feet of elementary classroom space and 5,866 square feet of high school classroom space (U.S. Department of Energy, 1978). If sufficient space were not available in the market area, it would cost roughly \$708,268 to build the necessary space (in 1975 dollars). Table 8-24 shows how the counties would be impacted.

Total public capital costs that may be required could reach a maximum of \$1.5 million. It is anticipated that public costs would be below this figure. Under 1977 average mill levies the three counties in the ES area would receive \$476,000 in property taxes. The counties would not obtain these revenues until the land is deeded to the applicant.

Desert Land Act

The number of acres developed into farms and the number of acres taken out of livestock production would be the same as under the Carey Act. Due to the lack of a residency requirement under the DLA, it is estimated that only 10 percent of the farms would have resident owner/operators. The remainder of the farms would have non-resident owner/operators who maintain their residence somewhere in the market area.

The primary employment impacts would be an additional 45 farmers and a loss of 3 ranch workers. Since secondary impacts are based on earnings, they would be the same as under the Carey Act. Total employment changes by industry are shown in Table 8-25. The major impacted industries are wholesale and retail trade and services.

By the year 2000 the labor force would be 69 percent higher than in 1975. This alternative would slow down the projected decrease in agricultural employment (Idaho Department of Water Resources 1978).

As a result of this alternative, the maximum increase in population in the market area would be 433. This was based on 1975 employment to total population ratios. Table 8-26 describes the age breakdown of the new population.

The change in earnings in the market area would be the same with the DLA as with the CA.

TABLE 8-24

CAREY ACT
MINIMUM AGRICULTURAL DEVELOPMENT
LOCAL SERVICES

	<u>Owyhee</u>	<u>Elmore</u>	<u>Twin Falls</u>	<u>Canyon</u>	<u>Area Summary</u>
Workers	67	71	18	73	229
Population	154	168	44	172	537
Children (5-17 yrs.)	45	48	12	50	155
School Children	40	43	11	45	139
Elementary	29	31	8	32	100
High School	11	11	4	12	39
Elementary Sq. Footage	3,485	3,726	961	3,846	12,018
High School Sq. Footage	1,702	1,819	469	1,877	5,866
Cost of School Construction	\$176,337	\$188,498	\$48,645	\$194,579	\$ 608,060*
Cost of School Furnishings	\$ 21,160	\$ 22,620	\$ 5,837	\$ 23,349	\$ 72,967
Cost of School Land	\$ 7,900	\$ 8,445	\$ 2,180	\$ 8,717	\$ 27,241
Number of Teachers	2	2	1	2	7
Health Care Personnel	2	2	1	2	7
Firemen & Policemen	1	1	1	1	4
Cost of Public Facilities	\$228,131	\$243,864	\$62,933	\$251,130	\$ 786,658
Total Public Capital Costs	\$441,958	\$472,438	\$121,919	\$487,677	\$1,523,992

All dollar figures are in 1975 dollars.

SOURCE: U.S. Department of Energy, 1978, and Idaho State Office, Bureau of Land Management.

Note: Numbers may not add up to totals due to rounding.

TABLE 8-25
EMPLOYMENT CHANGES, NUMBER OF JOBS
DESERT LAND ACT - MINIMUM AGRICULTURAL DEVELOPMENT

<u>Industry</u>	<u>Due to Primary Livestock Loss</u>	<u>Due to Primary Agriculture Gain</u>	<u>Total</u>
Agriculture			
Livestock	-3	+7	+4
Other Agriculture	0	+109	+109
Contract Construction	0	+6	+6
Food and Kindred	0	+7	+7
Transportation & Communications	0	+7	+7
Wholesale and Retail Trade	0	+20	+20
Services	0	+12	+12
Other	-1	+21	+20
Total	-4	+189	+185

SOURCE: Idaho State Office, Bureau of Land Management, Dynamic Regional Analysis Model, January 1979

TABLE 8-26
AGE BREAKDOWN OF NEW POPULATION

<u>Age Group</u>	<u>Number</u>
5 yrs.	44
5-17 yrs.	125
18-29 yrs.	122
30-44 yrs.	84
45-64 yrs.	43
65 + yrs.	<u>15</u>
	433

SOURCE: Idaho State Office, Bureau of Land Management, U.S. Department of Energy, 1978

TABLE 8-27

DESERT LAND ACT
MINIMUM AGRICULTURAL DEVELOPMENT
LOCAL SERVICES

	<u>Owyhee</u>	<u>Elmore</u>	<u>Twin Falls</u>	<u>Canyon</u>	<u>Area Summary</u>
Workers	48	52	13	72	185
Population	110	121	32	170	433
Children (5-17 yrs.)	32	35	8	49	125
School Children	29	31	8	43	112
Elementary	21	23	6	32	81
High School	8	8	2	11	31
Elementary Sq. Footage	2,531	2,726	681	3,797	9,735
High School Sq. Footage	1,214	1,308	327	1,822	4,670
Cost of School Construction	\$127,341	\$137,136	\$ 34,284	\$191,011	\$489,771
Cost of School Furnishings	\$ 15,281	\$ 16,457	\$ 4,114	\$ 22,922	\$ 58,773
Cost of School Land	\$ 5,704	\$ 6,144	\$ 1,536	\$ 8,557	\$ 21,942
Number of Teachers	1	1	1	2	5
Health Care Personnel	1	1	1	2	5
Firemen & Policemen	1	1	0	1	3
Cost of Public Facilities	\$164,568	\$177,228	\$ 44,307	\$246,853	\$632,956
Total Public Capital Costs	\$318,818	\$343,343	\$ 85,836	\$478,228	\$1,266,225

*All dollar figures are in 1975 dollars.

SOURCE: U.S. Department of Energy, 1978, and Idaho State Office, Bureau of Land Management.

Note: Numbers may not add up to totals due to rounding.

Implementation of this alternative via provisions of the DLA would lead to an increase of approximately 125 children in the 5-17 age group. This would mean an increase of 112 new school pupils - 81 elementary and 31 high school. These students would require 9,735 square feet of elementary classroom space and 4,670 square feet of highschool classroom space (U.S. Department of Energy, 1978). If sufficient space were not available in the market area, it would cost roughly \$507,000 to build the necessary space (in 1975 dollars). Table 827 shows how the counties would be impacted.

Total public capital costs that may be required could reach a maximum of \$1.2 million. It is anticipated that public costs would be below this figure. Revenues received by the counties would be the same as with the CA.

Crop Prices

Price effects under the minimum development alternative for both Carey Act and Desert Land Act are hardly perceptible. The Pacific Northwest (PNW) potato price would fall 1 cent per hundred-weight (cwt) and the U.S. average price would fall 2 cents per cwt (Blakeslee 1979).

Replacements of existing production are estimated to be .86 million cwt outside the PNW and .77 million cwt within the region. After taking account of the estimated production in the study area, the increments of change in the PNW and total U.S. potato production would be 1.5 and .29 million cwt, respectively (Blakeslee 1979).

The price effects are relatively minor since most of the effects take the form of displacements of production on producing units, which existed prior to development in the new producing area. The exact degree of displacement depends on how rapidly the new production comes on line and on how much time is allowed for adjustment. As Dr. Blakeslee's report states, "the displacement effect need not represent a great decline in economic well-being among those who leave or reduce potato production. This is because it is not the average producing unit which leaves under such circumstances. Rather, it is the one for which potato production was originally only a marginal choice relative to the next best economic alternative. Presumably, not much economic well-being is lost when such units take up the next best alternative rather than continue in potato production" (Blakeslee 1979).

In summary, this alternative would have virtually no effect on prices (1 cent in PNW and 2 cents on the U.S.), would increase production slightly (.29 million cwt), and some marginal potato producers would discontinue producing potatoes and take up the next best alternative.

Impact Summary

Carey Act

Implementation of this alternative via provisions of the Carey Act would lead to increased employment by 229 jobs and an increase in population of 537. Total earnings could increase as much as \$5.1 million. There would be 139 more school children which would require 7 new teachers. The increased population would require 7 additional health care personnel and 4 additional firemen and policemen. The cost of required public facilities could be as much as \$787,000 and the total public capital costs could reach \$1.5 million.

Desert Land Act

Implementation of this alternative via provisions of the Desert Land Act would lead to increased employment by 185 jobs and an increase in population of 433. Total earnings could increase as much as \$5.1 million. There would be 112 more school children which would require 5 new teachers. The increased population would require 5 additional health care personnel and 3 additional firemen and policemen. The cost of required public facilities could be as much as \$633,000 and the total public capital costs could reach \$1.2 million.

Due to reductions of livestock grazing from farm development under this alternative, ranches would lose about \$36,000 income annually.

ENERGY

Electrical Energy

Estimation of Electricity Use

The land in the minimum development alternative is all land in the proposed action alternative with a lift height less than 500 feet. The measurement of the minimum alternative, however, includes nearly 4,000 acres of river-irrigated land that was previously tabulated at higher lift heights in the proposed action measurement described in Chapter 2. The lift height for those 4,000 acres is greater than 500 feet if they are assumed to be irrigated by the shortest route from the river, i.e., the water would have to be pumped up over higher land in between; however, if they are assumed to be irrigated by a round-about route, the lift height is less than 500 feet.

Out of the 21,702 acres assumed to be irrigated from the river, (see Table 1-3, Chapter 1) the median lift height and distance is 450 feet and 2-4 miles. For the total 28,590 acres in the minimum development alternative, including 6,888 acres irrigated out of wells, the median lift height and distance is 350 feet and 0-2 miles from the river.

Table 8-28 shows the direct consumption (line 1), downstream hydro losses at IPC dams (line 2) and the total load including a line loss factor added to direct consumption on the IPC system created by the minimum development alternative in the average year (line 3). Table 8-29 shows the same for the worst case (drought) year.

In the average case year, July load is 36.2 average MW. In the worst case year, the June load is 45.6 average MW. Total load over the season would be 100,042 MWH in the average case, 127,922 MWH in the worst case (see Appendix 8-1 for further discussion of these calculations).

Load on IPC Electricity Supply

The impact of the minimum development alternative in the average case year is illustrated in Figure 8-2 which shows minimum development monthly load superimposed on IPC loads and resources. For the two most likely supply scenarios, IPC would require 45 MW of new generating capacity to meet minimum development July load in Case 1B. In Case 2, IPC would require 100,000 MWH of output from plants built by other utilities.

The minimum development alternative would irrigate about 26 percent as many acres as the proposed action, with an electricity consumption of about 16 percent as much as the proposed action. The average direct KWH use per acre in the minimum development alternative is 2087 KWH per acre compared with 3368 KWH per acre in the proposed action. This is a result of the lower lifts and shorter distances from the Snake River.

Impacts on IPC Ratepayers

The top half of Table 8-30 shows 1977 base average prices and new average prices for the two most likely scenarios for various IPC customer classes. The bottom of Table 8-30 shows the increase in 1977 annual electric bills that would occur under these scenarios for the 1977 average electricity use by customers in each class.

Table 8-31 shows the distribution of total annual cost between new irrigators, revenue from electricity sales during the non-irrigation months and revenue from existing IPC customers. In supply scenario Class 1B, total annual cost would be \$11.3 million. Approximately \$2.4 million would be recovered from sales to new irrigators and exported power, leaving \$8.9 million to be recovered from IPC ratepayers. In Case 2, total cost would be \$4 million per year, with \$1 million from new irrigators leaving \$3 million to be absorbed by IPC ratepayers.

Table 8-32 shows these distributions of cost on a per acre basis. In Case 1B existing IPC customers would pay \$311 per acre per year or in Case 2, \$106 per acre per year. The overall impact to existing customers would be an increase over 1977 revenues of 7.5 percent in Case 1B or 2.7 percent in Case 2.

TABLE 8-28

ELECTRICITY CONSUMPTION BY MINIMUM DEVELOPMENT ALTERNATIVE

	(Average MW)							TOTAL (MWH)
	- Average Year -							
	Apr	May	June	July	Aug	Sept	Oct	
Direct Consumption	3.3	8.0	19.1	21.7	16.8	9.9	2.4	59,664
Indirect Consumption (Hydro losses on IPC system)	2.1	4.8	11.0	12.5	9.7	5.8	1.6	34,835**
Total Load on IPC System *	5.7	13.5	31.9	36.2	28.1	16.6	4.1	100,042

* Total Load = Direct Consumption/.915 + Hydro Losses.
(.915 is a factor to account for line losses.)

** Losses over irrigation season

SOURCE: Integrated Energy Systems, Inc, Boise, Idaho (Contract No. YA-512-CT8-226).

Table 8-29

ELECTRICITY CONSUMPTION BY MINIMUM DEVELOPMENT ALTERNATIVE

	(Average MW)							TOTAL (MWH)
	- Worst Case Year -							
	Apr	May	June	July	Aug	Sept	Oct	
Direct Consumption	6.7	13.7	27.5	24.4	20.7	12.8	4.3	80,762
Indirect Consumption (Hydro losses on IPC System)	4.0	8.1	15.6	15.1	11.5	7.2	2.6	47,160**
Total Load on IPC System *	11.4	22.9	45.6	41.8	34.2	21.2	7.3	127,922

* Total Load = Direct Consumption/.915 + Hydro Losses.

** Losses over irrigation season.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

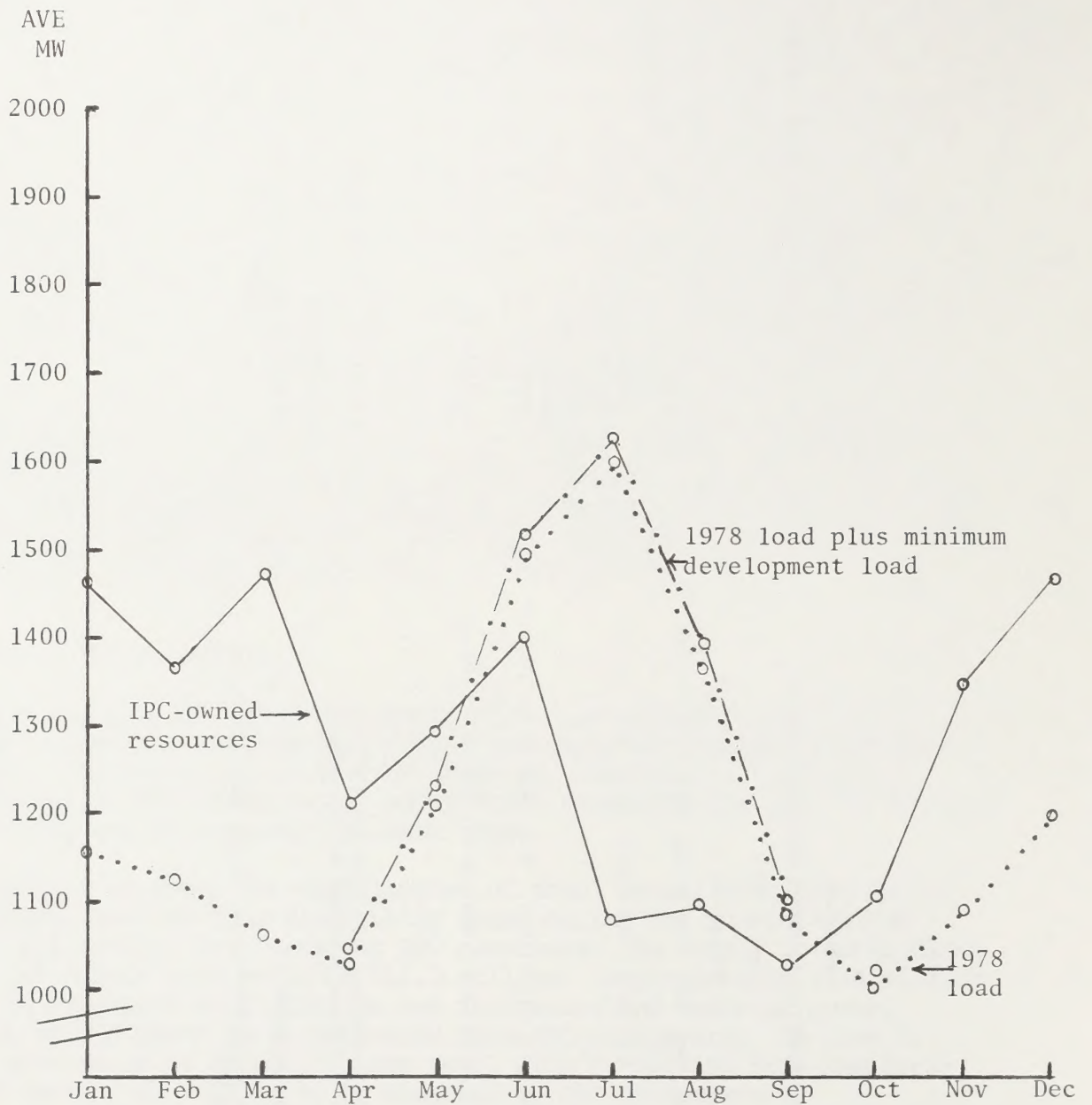


Figure 8-2

IMPACT OF MINIMUM DEVELOPMENT
ON IPC RESOURCES AND LOAD
(AVERAGE YEAR)

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

The most important energy impacts of the minimum development alternative would result from the effect of increased electricity prices described above on existing IPC ratepayers.

For residential customers the increases over 1977 electric bills would be \$15 per year in Case 1B or \$5 per year in Case 2.

For small commercial customers the increase in annual electric bill would be \$115 per year in Case 1B or \$39 per year in Case 2. For large commercial customers increases would be \$7,647 per year or \$2,537 per year.

Irrigators annual electric bills would rise \$147 per year in Case 1B, \$49 per year in Case 2 for the average seasonal use of a 100 HP pump.

Because the electricity consumption and electricity price increases to IPC customers are less than the proposed action by more than just the proportional reduction in acres, the minimum development impacts, though significant, would be much less severe.

Regional Impacts

Assuming a value of 617.7 KWH cost per acre foot of water diverted, the total loss caused by the minimum development alternative on the eight downstream FCRPS dams is 37,893 MWH in an average year, and 52,483 MWH in a worst case year. Valued at 35 mils/KWH, this amounts to \$1.3 and \$1.8 million in the average and worst case year.

In Case 1B, where IPC exports electricity at 10 mils/KWH those losses would be offset by the availability of this cheap power.

Chemical Energy Impacts

As shown previously (Table 8-18), the chemical energy consumption of the maximum development alternative would have no measurable effect on Idaho supplies. Since the minimum development consumption would be far less (by comparison of 28,590 acres to 176,310 acres) the impact on Idaho consumption would be insignificant.

Impact Summary

Electricity supply requirements of minimum development in an average case year would be 100,042 MWH. This includes line losses and hydro-electric losses resulting from irrigation diversions. The July load would be 36.2 average MW during average year and 43 average MW in June during the worst case conditions.

In the first of the "most likely" supply cases, 1B, it is assumed that IPC would construct 45 MW of new thermal generating capacity to meet

Table 8-30

IMPACT OF MINIMUM DEVELOPMENT ON CUSTOMER PRICES

	1977 BASE	CASE 1 IPC ADDS 45 MW CAPACITY Situation B	CASE 2 IPC PARTICIPATION IN NEW PLANTS
AVERAGE PRICES (mils/KWH)			
System	16.3	17.2	16.6
Irrigators	16.0	16.9	16.3
Residences	20.7	21.8	21.1
Small Commercial*	22.5	23.7	22.9
Large Commercial**	12.5	13.2	12.7
AVERAGE YEARLY INCREASE TO 1977 CUSTOMERS (\$/year)			
Irrigators***	2622	147	49
Residences	287	15	5
Small Commercial*	2153	115	39
Large Commercial**	136552	7647	2537

* Schedule 12

** Schedule 19

*** Corresponds roughly to the seasonal use of a 100 HP pump.

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho (Contract No. YA-512-CT8-226).

Table 8-31

TOTAL COST OF MINIMUM DEVELOPMENT TO IPC SYSTEM

(MILLION \$)

	CASE 1 Situation B	CASE 2
TOTAL INCREASE TO SYSTEM	11.3	4.0
REVENUE FROM MINIMUM DEVELOPMENT	1.0	1.0
REVENUE FROM OFF-PEAK SALES	1.4	--
NET COST TO 1977 IPC SYSTEM	8.9	3.0

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho.
(Contract No. YA-512-CT8-226)

Table 8-32

PER ACRE COST OF MINIMUM DEVELOPMENT TO IPC SYSTEM

(\$)

	CASE 1 Situation B	CASE 2
COST OF MINIMUM DEVELOPMENT	395	140
REVENUE FROM MINIMUM DEVELOPMENT	35	34
COST RECOVERED BY OFF-PEAK SALES	49	--
COST BORNE BY 1977 IPC CUSTOMERS	311	106

SOURCE: Integrated Energy Systems, Inc., Boise, Idaho.
(Contract No. YA-512-CT8-226)

minimum development July load. In Case 2 it is assumed that IPC would obtain 100,000 MWH during the summer through participation in a new thermal power plant constructed by another utility.

In Case 1B the total annual cost would be \$11.3 million with \$1 million paid by new irrigators and \$8.9 million absorbed by other IPC ratepayers. In Case 2, the total would be \$4.0 million per year with \$1.0 million paid by new irrigators and \$3.0 million paid by other IPC ratepayers.

The resulting increases over 1977 annual bills for the average use customer in each class is shown below.

\$/Year	Residential	Small Commercial (Sched 12)	Large Commercial (Sched 19)	Irrigation
Case 1B	15	115	7647	147
Case 2	5	39	2537	49

Losses of hydroelectric generation at federal dams on the Snake/Columbia system would total 37,900 MWH in an average case year and cost \$1.3 million to replace with new thermal generating capacity.

ALTERNATIVE 3: ALLOW NO FARM DEVELOPMENT

An impact analysis for this alternative would be similar to the narrative found in Chapter 2, Future Environment. The environmental conditions/impacts described in this section are set at about the year 2000.

ALTERNATIVE 4: FLPMA LEASE

For the following listed resources, impacts of farming by FLPMA leasing would be identical to farming under the DLA and CA disposal methods. The reader is referred to impact analysis for these resources in Chapters 3 and 5 for the proposed action level and this chapter for impacts under the maximum (Alternative 1) and minimum (Alternative 2) development levels.

- Climate
- Geology and Topography
- Water Resources (surface)
- Vegetation
- Wild Horses
- Wilderness
- Minerals
- Livestock Grazing
- Land Use Plans, Controls and Constraints
- Transportation

Due to the management goals that the BLM would adopt for issuing FLPMA leases, the following resources would be impacted differently than if development was allowed under DLA and CA.

AIR QUALITY

Blowing dust generated from farmland during windy spring months would likely be reduced by management goals under FLPMA lease. Requiring at least 25 percent of the land to be in soil building crops at all times plus requiring winter grain or other crops to be planted after potato, sugar beet, and bean harvests would guarantee that farmland would have a cropping cover through most of the year. Air quality would be judged to be slightly better under lease than if the farms were developed by DLA and CA.

SOILS

Soil conservation would be emphasized by requiring Best Management Practices (BMPs). Cropping controls would assure a certain amount of soil building crops in the rotation. The use of winter grain would provide cover during the spring windy periods and/or it could be plowed under for an organic matter additive before row crops (potatoes, sugar beets, beans) were planted in the spring. Minimum tillage practices could reduce soil compaction which retards water percolation, and chisel plowing would break up hard pans in the soil structure. Under CA and DLA, farmers are not required to use BMPs. Thus, maintenance of soil fertility would be more likely under FLPMA lease.

WATER RESOURCES (Water Quality)

All impacts would be the same as those listed under DLA and CA disposals except that the probability of accidental or storm-caused overland runoff and wind would be reduced by the conservation measures prescribed under FLPMA lease. Hence there is reduced likelihood of accidental introduction of phosphates, pesticides or heavy metals into the river.

WILDLIFE

Wildlife management goals under FLPMA lease could enhance habitat for pheasants, quail, Hungarian partridge, and various waterfowl. Lease provisions would also serve to maintain native wildlife habitat within the farm units. As a result certain small mammals and birds which are adapted to the shrub/grassland habitat type would remain in these areas. A secondary beneficial impact would be an increase in agriculturally oriented species and a maintenance of native wildlife species leading to an increased prey base for raptors near farmland. Establishment of shrubs, forbs, grasses, and/or trees at certain locations would benefit wildlife species. Under FLPMA lease, on-farm wildlife habitat would be substantially better than CA and DLA on farm habitat.

All fishery impacts would be the same as those discussed under DLA and CA disposals except that the probability of accidental or storm-caused overland water runoff or wind erosion would be reduced by the conservation measures prescribed by FLPMA lease. Therefore, there is a slightly reduced likelihood of fish mortalities caused by heavy metals or other toxicants.

CULTURAL RESOURCES

Impacts to cultural and paleontological resources under FLPMA lease would only be expected to vary slightly from DLA and CA farms. Leases would require the lessee to cease operations and notify the BLM should cultural or paleontological resources become apparent in the course of farm construction. This would improve the chance of unknown sites being preserved since CA and DLA farmers would not be required to stop operation if a site were found. This lease requirement would, however, be difficult to enforce.

VISUAL RESOURCES

FLPMA leases would require that on-farm structures and powerlines be located and designed utilizing the BLM Visual Resource Management

System. Farm facilities could be made to be more visually and aesthetically acceptable, thus softening landscape impacts of new farm intrusions. Overall visual impacts would be judged to be slightly less under FLPMA lease than DLA and CA transfers.

RECREATION

Recreation access, primarily hunting, would be allowed on lease farmland as long as the use would not conflict with farm operations or jeopardize the lessees investment. This would normally give the public a better chance at hunting opportunity in farm areas since private land is often posted and closed to public hunting.

SOCIO-ECONOMIC

Under this alternative, lessees would lease the land from BLM at a rate comparable to costs of renting farmland in the private sector. Since those lease values would be based on fair market value for purchasing the land, it is assumed that FLPMA leasing would have the same impacts as purchasing land under Alternative 5 FLPMA Sale, i.e., lease rents would be the same as mortgage payments of purchasing land. Lease rates would be based on land values of about \$250 per acre (native desert land). Rental rates would be approximately \$600 per month on a 320 acre farm unit totaling \$7,200 per year. This is based on comparable leases in the area at \$22.50 per acre per year. These costs would be an addition to the farm budgets depicted in Appendix 3-2. Under the best circumstances of high crop returns and low energy costs, the hypothetical farm would be losing approximately \$500 per year although some money would be returned to the farmer if he did his own labor. (Refer to the net farm income Table 3-8, Chapter 3).

It is unlikely that farm development would occur, given the extra cost of leasing the land, unless farm prices rose dramatically.

Should farm prices rise enabling development to take place as depicted in Chapter 3, then the impacts on local government and sociological factors would be about the same as in Chapter 3, Desert Land Act.

In a recent survey sent out from the Idaho Department of Water Resources, to Carey Act and Desert Land Act applicants the respondents said they would not want to lease federal land. The main reason given for this was the opinion that the federal government does not belong in the landlord business.

ENERGY

Under FLPMA lease, it would be possible to mitigate some chemical energy impacts. If Best Management Practices were followed, namely a requirement that 25 percent of the lease acreage were devoted each year to "soil building crops," then the consumption of fertilizer, particularly nitrogen, might be reduced.

ALTERNATIVE 5: FLPMA SALE

For the following listed resources, impacts of farming by FLPMA Sale will be identical to farming under DLA and CA disposal methods. The reader is referred to the impact analysis for these resources in Chapters 3 and 5 for the proposed action level and this chapter for impacts under the maximum (Alternative 1) and minimum (Alternative 2) development levels.

- Climate
- Geology and Topography
- Water Resources (surface)
- Vegetation
- Wildlife
- Wild Horses
- Cultural Resources
- Visual
- Wilderness
- Minerals
- Livestock Grazing
- Transportation

Due to the FLPMA Sale provisions, the following resources may be impacted differently than if farm development was allowed under DLA and CA.

AIR QUALITY

Blowing dust generated from farmland during windy spring months would likely be reduced by the soil conservation covenant (in the form of BMPs) as required in the FLPMA Sale patent. At least 25 percent of the land would be in soil building crops at all times, plus winter grain or other cover crops would be required to be planted after fall potato, sugar beet, and bean harvests. This would mean that most farm ground would have a cropping cover throughout the year and air quality, consequently, would be judged to be better under FLPMA sale than if the farms were developed under the DLA and CA authorities.

SOIL

Soil conservation would be emphasized by requiring Best Management Practices (BMPs). Cropping controls would assure a certain amount of soil building crops in the rotation. The use of winter grain would provide cover during the spring windy periods, and/or it could be plowed under for an organic matter additive before row crops (potatoes, sugar beets, beans) were planted in the spring. Minimum tillage practices would reduce soil compaction which retards water percolation, and chisel plowing would break up and retard hard pans from forming in the soil structure. Under CA and DLA, farmers would not be required to use BMPs. Thus, maintenance of soil fertility would be more likely under FLPMA sale.

WATER RESOURCES (Water Quality)

All impacts would be the same as those listed under DLA and CA disposals except that the probability of accidental or storm-caused overland runoff and wind erosion would be reduced by the BMP covenants in the FLPMA patents. Hence there is reduced likelihood of accidental introduction of phosphates, pesticides or heavy metals into the river.

WILDLIFE (Fisheries)

All fishery impacts would be the same as those listed for DLA and CA disposals except that the probability of accidental or storm-caused overland flow of water runoff or wind erosion would be reduced by BMP covenants in the FLPMA patents. Therefore, there is reduced likelihood of fish mortality caused by heavy metals or other toxicants.

RECREATION

A patent reservation would allow public recreational access, primarily for hunting. This would require land patented under FLPMA sale to be open for hunting as long as there would be no conflict with farm operators or jeopardize the owners investments. However, public hunting would be under "hunting by permission only" procedures. This would give sportsman a better chance at hunting opportunity in farm areas since private land is often posted and closed to hunting.

LAND USE PLANS, CONTROLS AND CONSTRAINTS

Urban expansion has encroached onto prime farm land in many areas of the Nation and taken land out of agricultural production. Under FLPMA sale, a covenant would be in the patent that would perpetually preserve the land for agricultural land uses. Urban expansion onto farm land is not currently a problem in the ES area, but such a covenant would assure that it would not occur in the future.

SOCIO-ECONOMIC

Under this alternative applicants would buy the land at fair market value. Land costs would be an additional financial burden that is not a factor under DLA and CA. Assuming a 320 acre farm, and assuming the market value of native desert land would be \$250 per acre, the price of the land would be \$80,000. If the farmer puts ten percent down and borrows \$72,000 for a 30 year period at 9.25 percent interest, his

monthly land payments would be \$592.33 or \$7,107.96 per year. These costs would be an addition to the farm budgets depicted in Appendix 3-2. Even under the best circumstances, high crop returns and low energy costs, the hypothetical farm would be losing approximately \$500 per year. (Refer to the net farm income Table 3-8, Chapter 3.)

It is unlikely, given this set of circumstances that any farm development would occur in the ES area unless farm prices rise dramatically.

Should crop prices rise, enabling development shown in Chapter 3, then the impacts on local government and the sociological impacts would be about the same as in Chapter 3, Desert Land Act. There is the possibility that for some, FLPMA sale could be more advantageous. By gaining title to the land with its purchase, they might more easily qualify for mortgage money which could be used for farm development costs. In addition, some individuals who did not currently qualify under DLA or CA authority (for instance, people who had previously received public land by the DLA or CA) could get more land under FLPMA sale.

ENERGY

Under FLPMA sale, it would be possible to mitigate some chemical energy impacts. If Best Management Practices were followed, namely a requirement that 25 percent of the lease acreage were devoted each year to "soil building crops," then the consumption of fertilizer, particularly nitrogen, might be reduced.

ALTERNATIVE 6: FLPMA Exchange

Environmental impacts under FLPMA Exchange are judged to be identical to those previously discussed under FLPMA Sale. Economic impacts would likely be more favorable to farmers under FLPMA Exchange due to essentially no land costs but otherwise similar to the DLA authority.

Conceivably, the 111,015 acres of public land which would be converted to cropland would be replaced by a similar acreage of private land during the exchange process. Some of the land acquired by the BLM could be of higher value for recreation, wildlife, watershed, or other public use than land transferred into private ownership. Some land acquired could be inholdings within significant BLM recreation areas such as wild rivers, proposed wilderness areas, and ORV areas. Other private land acquired by exchange could be inholdings within National Forests and could be of importance to the U.S. Forest Service for recreational purposes and wilderness management.

TABLE 8-33
 IMPACTS-COMPARATIVE MATRIX OF PROPOSED ACTION AND ALTERNATIVES

RESOURCE IMPACTED	PROPOSED ACTION	#1 MAXIMUM DEVELOPMENT 176, 310 acres-DIA/CA	#2 MINIMUM DEVELOPMENT 28, 590 acres-DIA/CA	#3 NO DEVELOPMENT	#4 FLPMA LEASE	#5 FLPMA SALE	#6 FLPMA EXCHANGE
AIR QUALITY	111, 015 acres-DIA/CA Lowered air quality would exceed annual secondary, primary and 24 hr. dust particulate standards in spring months. Average annual increase in dust particulates of up to 10 micrograms/m ³ near region of agriculture development.	Total regional suspended particulates would be almost twice that of proposed action. Duration would be the same.	Total suspended dust particulates would be 1/4 that of proposed action. Duration would be the same.	None	← Slight reduction from DIA/CA type farm development. →		
SOILS	Slight soil erosion sprinkler irrigation less than 2 tons/acre. Wind erosion will vary with weather and farm practices ranging from 0-15 tons/acre.	Water and wind erosion induced erosion rates are predicted to be 10-15% higher than the proposed action.	Same soil erosion rates as proposed action.	None	Best management practices would slightly reduce irrigation erosion, but substantially reduce wind erosion by requiring winter cover crops and 25% of the farm land to be planted to soil building crops.		
WATER RESOURCES	Uses and Flows Snake River-reduced annual flow by 250,004 acre feet or 1,034 CFS during peak pumping period; during low water years, mean-flows could drop 17% below IF&G recommended maintenance flows. Ground water-reduce aquifer supplies by 27,823 acre feet.	Snake River-reduced annual flow by 357,000 acre feet or 1510 CFS during peak pumping period; during low water years, mean flows could drop as much as 26% below IF&G recommended maintenance flows. Ground water-reduce aquifer supplies by 97,900 acre feet, causing water use conflicts.	Snake River-reduced annual flow by 56,000 acre feet or 200 CFS during peak pumping. Ground water-reduce aquifer supplies by 17,800 acre feet.	None	← Same as DIA/CA type farm development. →		
Water Quality Snake River	Slight increase in nitrates, slight increase in temperature during low flow years, slight increase in sedimentation in low flow years above C.J. Strike.	Slight increase in nitrates, conductivity and water temperature during normal flow years. pH would increase slightly.	No detectable change.	None	← Same as DIA/CA type farm development except for slight decrease in likelihood of overland flow accidents and wind erosion. →		

<p>Tributary Drainages</p>	<p>Turbidity, bacteria, heavy metals and pesticides would decrease very slightly in average or high flow years between Hammett and CJ Strike Pool.</p>	<p>Turbidity would decrease slightly above CJ Strike Pool in both average and low flow years. Bacteria, heavy metals and pesticides would decrease very slightly in average flow years.</p>	<p>None</p>	<p>← Same as DLA/CA type farm development. →</p>
<p><u>VEGETATION</u></p> <p><u>Terrestrial</u></p> <p><u>Aquatic</u></p>	<p>Moderate increase in silt, conductivity and nitrates.</p>	<p>Moderate to heavy increase in silts. Conductivity and nitrates.</p>	<p>None</p>	<p>None</p>
<p><u>WILDLIFE</u></p> <p><u>Terrestrial</u></p>	<p>Up to 129,915 acres of natural vegetation would be replaced by cropland.</p> <p>During low flow years there would be a moderate increase in phytoplankton in the Snake River.</p>	<p>Up to 207,080 acres of natural vegetation would be replaced by cropland.</p> <p>Slight to moderate increase in phytoplankton in the Snake River.</p>	<p>None</p>	<p>None</p>
<p><u>WILDLIFE</u></p> <p><u>Terrestrial</u></p>	<p>40-60 mule deer will be displaced or lost; 47,285 acres (sagebrush/grass) of pygmy rabbit habitat lost; 61,715 acres (shrub/grass) of non-game species habitat lost-raptor prey based reduced; 20-50 sagegrouse displaced or lost;</p> <p>← Reduction in sensitive species (western burrowing owl, ferruginous hawk, long-billed curlew) populations even with required mitigative measures. →</p> <p>← Barn owl and kestrel raptor populations would increase from agricultural expansion. Waterfowl species would feed on grain stubble of cropland, but would lose some nesting opportunities on Snake River islands due to increased predation from lower water flows. →</p>	<p>80-120 mule deer will be displaced or lost; 76,166 acres (sagebrush/grass) of pygmy rabbit habitat lost; 132,531 acres (shrub/grass) of non-game species habitat lost-raptor prey base reduced; 20-50 sagegrouse displaced or lost;</p>	<p>None</p>	<p>Some native wildlife habitat would be preserved within the farm unit-reducing impacts on small game species. All other impacts would be the same as DLA/CA farm development.</p> <p>← Same as DLA/CA type farm development. →</p>

TABLE 8-33 (continued)

RESOURCE IMPACTED	PROPOSED ACTION	#1 MAXIMUM DEVELOPMENT	#2 MINIMUM DEVELOPMENT	#3 NO DEVELOPMENT	#4 FLPMA LEASE	#5 FLPMA SALE	#6 FLPMA EXCHANGE
<u>Fisheries</u>	A reduction of game fish from 5-25% in the Snake River depending on annual flow conditions. An increase in rough fish populations. A moderate increase in mortality of sturgeon stocks in low flow years. Unknown quantity of fish entrained in pump intakes.	A reduction of game fish from 25-50% in the Snake River depending on annual flow conditions. An increase in rough fish populations. Decline in sturgeon stocks as much as 50%. Resident and anadromous fish downstream of ES area very slightly reduced in population. Unknown quantity of fish entrained in pump intakes.	Fish populations essentially unaffected. Unknown amount of fish entrained in pump intakes.	None	← Same as DIA/CA type farm development. →		
<u>CULTURAL RESOURCES</u>	An undetermined number of the following known sites would be impacted: 56 Prehistoric 3 Historic 2 Palenotological Even with required cultural clearance procedures, there would be a loss of much scientific information in the ES area although there would be the accumulation of cultural data through survey and excavation prior to farm development.	An undetermined number of the following known sites would be impacted: 65 Prehistoric 3 Historic 4 Palenotological	An undetermined number of the following known sites would be impacted: 9 Prehistoric 3 Historic 1 Palenotological	None	Slightly less damage to cultural resources due to lease requirements; otherwise impacts the same as DIA/CA type development.	← Same as DIA/CA type farm development. →	
<u>VISUAL RESOURCES</u>	An undetermined amount of roads and power lines into farm areas will cross the Oregon Trail and Kelton Road (VRM Class I); pump stations penstocks and roads in Snake River Canyon (VRM Class II) will cause visual intrusions.	Same as proposed action except to a greater extent because of larger amount of farm development.	Smaller impact than the proposed action because of less farm acreage.	None	Lease requirements will slightly reduce on farm visual impacts from proposed action and Alternative 2; otherwise impacts would be the same as DIA/CA type development.		

RECREATION

<p>60,400 acres of public land currently used for ORV activity would be developed for farms; sightseeing impacted slightly by visual intrusions in Snake River Canyon and along the Oregon Trail and Kelton Road; reduction of water based recreation on Snake River during low flow years.</p> <p>There would be an increase of about 6,600 hunter days annually for upland game species on isolated tracts.</p>	<p>86,000 acres of public land currently used for ORV activity would be developed for farms; other impacts the same as proposed action, but of greater magnitude.</p> <p>There would be an increase of about 10,360 hunter days annually for upland game species on isolated tracts.</p>	<p>20,000 acres of public land currently used for ORV activity would be developed into farms; sightseeing impacts would be reduced from proposed action.</p>	<p>← Same as DLA/CA type farm → development, except public hunting would be allowed on farm land also.</p>
<p>LIVESTOCK GRAZING</p> <p>127 ranchers would lose from 14,975 AUMs to 41,397 AUMs of grazing privileges.</p>	<p>127 ranchers would lose from 21,545 AUMs to 41,397 AUMs of grazing privileges.</p>	<p>None</p>	<p>← Same as DLA/CA type farm → development.</p>
<p>MINERAL RESOURCES</p> <p>1.3 million cubic yards of gravel material needed for new roads.</p>	<p>2.1 million cubic yards of gravel material needed for new roads.</p>	<p>None</p>	<p>← Same as DLA/CA type farm → development.</p>
<p>TRANSPORTATION</p> <p>300 miles of new farm access roads will be needed.</p>	<p>470 miles of new farm access road will be needed.</p>	<p>None</p>	<p>← Same as DLA/CA type farm → development.</p>
<p>SOCIAL-ECONOMIC</p> <p>Impacts based on 1976 Normalized crop prices and 16.5 mills per KWH</p> <p>CAREY ACT</p> <p>13 new school teachers needed; 13 additional health care persons and 8 new firemen and policemen needed; up to \$1.6 million for new public facilities and up to \$3.1 million for total public capital costs.</p> <p>459 new jobs, population increase of 1,073, an increase in total earnings up to \$4.7 million.</p> <p>DESERT LAND ACT</p> <p>8 new school teachers needed; 8 additional health care persons and</p>	<p>Impacts based on 1976 Normalized crop prices and 16.5 mills per KWH</p> <p>CAREY ACT</p> <p>20 new school teachers needed; 20 additional health care persons and 13 new firemen and policemen needed; up to \$2.6 million for new public facilities and up to \$4.9 million for total public capital costs.</p> <p>742 new jobs, population increase of 1,738, an increase in total earnings up to \$7.9 million.</p> <p>DESERT LAND ACT</p> <p>12 new school teachers needed; 12 additional health care persons and</p>	<p>None</p>	<p>Farming under FLPMA lease does not appear to be economically feasible. However, if crop prices were high enough to make farming</p> <p>Impacts would be similar to those described for DLA farm for FLPMA Lease development.</p>

OFF-STREAM STORAGE AND OFF-SITE DIVERSION CONCEPT

INTRODUCTION

Several comments received as a result of the Draft ES stated that the DES should have included a discussion of off-stream storage/off-season diversion. The Idaho Department of Water Resources (IDWR) is currently conducting a feasibility study on an off-stream storage proposal called the Bruneau Plateau Water Development Project. The study is due to be completed in 1982. Three development plans are being considered under the proposal, each considering different levels of farm development. If this proposal is found to be feasible, an environmental statement will be required.

The following discussion is presented in response to those comments with the desire to give the reader a conceptual description of agricultural development by off-stream storage.

DESCRIPTION

This concept of agricultural development employs the use of storage reservoirs located away from the Snake River. Water is diverted from the river, transported via canals, and stored in a reservoir until needed for irrigation of cropland. Water would generally be diverted from the Snake River between the months of November and May. High-lift pumps are used only as backup to pump water to the farmland when flows are not sufficient to provide needed water.

Of the public land included in the ES study area, about 60% could be served by an off-stream storage system. These areas are all located on the Bruneau Plateau (Saylor Creek Planning Unit), south of Bliss and west of Hagerman. The remaining land in the ES is currently considered unsuitable for off-stream storage development.

Water would most likely be conveyed through a canal system from the river to off-stream storage site (or sites). Water could be diverted at Milner (about 10 miles west of Burley) and carried through a canal roughly paralleling the existing Twin falls (High Line) Canal. About 100 to 120 miles of canal would be needed to transport water to storage sites near the new farms. Such a canal system would have potential sites for hydro power production.

There are several drainages on the Bruneau Plateau that have potential as storage reservoir sites. Since the drainages are somewhat shallow, dams would have long crests. Preliminary studies have indicated two sites appear feasible.^{1/} One on Saylor Creek would contain 330,000 acre feet and cover 6,000 acres. The other on Deadman Creek would contain 116,000 acre feet and cover 4,000 acres.

^{1/} U.S. Corps of Engineers, Preliminary Foundation and Geologic Invest. Saylor Cr. and Grindstone Butte Reservoir and Dam Sites, Walla Walla, Washington, Sept. 1978.

Water, one delivered to the storage reservoirs, would be brought to the farm by distribution canals. Relift pumps would be needed to bring water to farms lying at elevations higher than the storage reservoirs. Water would be applied to the land by pressurized sprinkler systems.

Historical flow data shows that Snake River flows would not be sufficient to fill the reservoirs in about one out of four years. In these years existing irrigation pumps along the river might be used to pump water into the storage reservoirs through a feeder canal system. It is possible that additional pumping stations would be needed. The possibility also exists that groundwater pumping or other storage in the upper Snake River drainage could be used during these dry periods.

Preliminary cost estimates of this type of development appear to be between \$1,000 and \$1,500 per acre. In addition to this system development cost, annual operating and maintenance costs might be more than \$100 per acre. Total yearly costs per acre, including system costs spread over 50 years, could be about \$150 per acre.^{2/}

Comparison: Off-Stream Storage vs. High-Lift Pumping

Off-stream storage (conceptually) and high-lift pumping have many similarities. Impacts to the land itself would be nearly the same since farm development (clearing, plowing, etc.) would not differ under either concept. Impacts described in Chapter 3 of this ES would also apply to farm development under off-stream storage. There are two major areas where impacts could be significantly different--these are (1) stream flows, and (2) energy consumption.

Stream Flows: Since diversion under the off-stream storage concept can occur while stream flows are highest, there is less likelihood of reducing Snake River flows to critical levels. Assuming diversion is possible anytime from November through April, average divertible flow at Milner is in the same order of magnitude as would be needed to fill the storage reservoirs described earlier.^{3/} About 2.5 to 3.0 acre feet of water would be diverted at Milner for each acre of farmland to be irrigated. The remainder would have to be pumped from the river.

Energy Consumption: The off-stream concept requires far less electrical energy than high-lift pumping because it employs gravity flow of water from the river to the storage sites. Without benefit of detailed analysis, it appears this concept would reduce the electrical demand considerably. In addition, some electricity could be generated within the canal system. During those periods that pumping from the river is required, pumping would be done from existing, and perhaps new, high-lift pump stations to fill storage reservoirs. It is assumed that cheaper power rates would be available since IPC exports surplus electricity to other utilities during the off-peak winter months at

^{2/} Idaho Dept. of Water Resources, Water Resources Development on the Bruneau Plateau In Idaho, Report to the Governor and Idaho Legislature for Authorization and Funding of feasibility Study, Nov. 1978.

^{3/} Ibid

reduced winter flows going downstream could adversely affect hydro-power generation for the Pacific Northwest, when demand peaks during the winter months. Each acre foot of water diverted at Milner would reduce hydrogeneration through the downstream dam complex by about 625 KWHs. However, private farmland irrigated by summer high-lift pumping and converted to winter off-stream storage would contribute to higher summer hydrogeneration through these same dams in normal flow years.

In addition to energy demand and stream flows, some other differences might exist. Off-stream storage reservoirs could provide recreation and wildlife habitat opportunities. These reservoirs could provide fishing, water skiing, boating and hunting that does not now exist. Waterfowl could gain considerable habitat. Upland game and other wildlife species could benefit from reliable water sources. Reservoirs would probably provide livestock watering also.

Energy sources for pumping from the river are assumed to be electrical. However, with the rapid increase in electrical energy costs, alternative energy sources have to be considered a distinct possibility. Pumping stations could be powered by diesel, alcohol, natural gas or liquid propane generators. In addition, solar and geothermal energy may be adaptable.

Off-Stream Storage by High-Lift Pumping: This version of off-stream storage is similar to the previously described system, except this concept would use existing river pump stations each year (not just dry years) to fill reservoirs. This type development would high-lift pump water primarily in March and April, which coincides with the Snake River high flow periods through pump plants that are used during the normal summer irrigation season. At least one desert land entry project is proposing to irrigate by this means. This system would not require construction of a lengthy canal to gravity-flow water from Milner. It is assumed that cheaper off-season, electric power rates would be available to run the pump stations in early spring months. Downstream hydrogeneration would be reduced by that amount of water diverted into reservoirs, however. Annual electricity use would likely be greater but overall project construction costs probably would be cheaper than the Bruneau Plateau Water Development Project.

CHAPTER 9

CONSULTATION AND COORDINATION

Chapter 9 indicates who was involved in developing this environmental statement. It lists and discusses the consultation and coordination that took place with other agencies, organizations and individuals.

CHAPTER 9

CONNECTION AND COORDINATION

The following text is extremely faint and illegible. It appears to be a list of items or a table of contents, but the specific details cannot be discerned.

CHAPTER 9 CONSULTATION AND COORDINATION

In January of 1976, the Idaho BLM released an environmental analysis report (EAR) entitled Agricultural Development Program Lower Snake River Plains of Idaho. The purpose of this document was to analyze the impacts associated with converting public land to agricultural use across southern Idaho. The report identified areas where high and low environmental impacts could be expected from new development. It did not, however, provide regional analysis of water or energy supplies to form a basis for the allocation of public land to new farm development. Most people who reviewed the document felt that farm development was a significant federal action and consequently requested the BLM to write a full environmental statement (ES). The subject proved to be complex due to competing and conflicting demands for land and water, the large area of public land and economic issues. The BLM worked closely with the Idaho Department of Water Resources (IDWR) since irrigation water allocation was an important consideration. Many meetings were held with IDWR during 1977 and 1978 to formulate a proposed action that was compatible with the goals of the State Water Plan. A committee of government agencies was formed in June 1977 to act as a scoping and guidance group. Membership consisted of:

- Idaho Budget Policy, Planning and Coordination Dept.
- Idaho Dept. of Health and Welfare
- Idaho Fish and Game Dept.
- Idaho State Office of Energy
- Idaho Dept. of Water Resources
- Idaho Dept. of Agriculture
- Bureau of Reclamation
- U.S. Fish and Wildlife Service
- Bureau of Land Management

By late 1977, a proposed action was nearly finalized. The Soil Conservation Service was contracted in the spring of 1978 to survey about 160,000 acres where soils information was lacking in the ES area. After the soil survey was completed in April 1978, a specific proposed action was identified based on the location of the best soils in the ES area.

ES TEAM ORGANIZATION

The ES Team was organized in February 1978 and consisted of BLM specialists in fisheries, minerals, soils, wilderness, cultural resources, wildlife, livestock administration, wild horses, vegetation, and recreation. In addition, there were socio-economic and hydrology specialists from IDWR, and two consulting firms were hired for the energy and water quality/fishery components.

CONSULTATION IN REVIEW OF THE DRAFT ES

Formal consultation under Section 7 of the Endangered Species Act of 1973 with the U.S. Fish and Wildlife Service was initiated on March 17, 1978. Of concern was the effect the proposed action would have on wintering bald eagles (an endangered species). After available information was analyzed and field examination completed, the U.S. Fish and Wildlife Service reached the opinion that the proposed action would not jeopardize the bald eagle. This was stated in a memorandum to BLM dated September 1, 1978.

A "Notice of Preparation of a Draft Environmental Impact Statement" was sent to the Idaho State Clearinghouse on March 24, 1978. The State Clearinghouse is responsible for notifying state and area-wide agencies of the ES proposed action and associated significant environmental issues. A number of agencies requested copies of the draft ES (DES).

Dr. Patricia Packard of the College of Idaho in Caldwell and Robert Steele of the U.S. Forest Service in Boise were consulted a number of times in the spring of 1978 regarding threatened and endangered plants in the ES area. Packard is a member and Steele is chairman of the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council.

On August 2, 1978, BLM sent a letter to Drs. Wright and White of Idaho State University requesting information pertaining to paleontological resources in the ES area. A response was received from a graduate student, Greg Conrad, indicating that there were several important fossil locations in the ES area, representing a wide variety of vertebrate specimens.

A news release was issued on October 13, 1978, to all Idaho newspapers and radio stations. The purpose of the release was to inform the public of the Boise District Agricultural Development ES and to obtain citizen input into formulation of the DES.

Dr. Howard R. Cramer of Emory University, Atlanta, Georgia was contacted by telephone and by letter on December 21, 1978, for information regarding the Oregon Trail and Kelton Road in southwestern Idaho. Dr. Cramer responded with loan of a number of Oregon Trail diaries for documentation of the route in the ES area.

A number of informal contacts were made with the State Historic Preservation Office (SHPO) for the following purposes:

- 1) To identify any cultural properties in the ES area currently in the process of nomination to the National Register of Historic Places.
- 2) To identify any cultural properties in the ES area for which formal determinations of eligibility for the National Register have been made or are pending.

- 3) To identify additional National Register eligible cultural properties in the ES area by applying the criteria set forth in 36 CFR 800 (see Appendix 1-3).
- 4) To evaluate the adequacy and potential effectiveness of mitigation contained in the proposed action.

The SHPO was formally contacted by BLM to review the DES so as to be in compliance with Section 106 of the National Historic Preservation Act.

In November of 1978, over 200 fact sheets and ES area maps were sent out to various federal, state, and local agencies; county governing and planning bodies; organizations; and interest groups for the purpose of soliciting participation.

PUBLIC COMMENTS AND RESPONSES ON THE DRAFT ENVIRONMENTAL STATEMENT

A 45day public comment period (May 11 through July 3, 1979) was provided on the Draft Environmental Statement (DES) to allow for public review and comment. Over 750 copies of the DES were mailed to individuals, federal, state and local government agencies and to non-government organizations. Notification of its availability was published in the Federal Register on May 11, 1979. In addition to the Federal Register notice, a national press release was issued from the BLM Washington Office. The BLM Boise District Office sent out a media release to approximately 300 statewide and regional television and radio stations and newspapers. The Federal Register and media releases also gave the dates and places for the following listed public hearings that were held:

June 11, 1979 - Rodeway Inn, Boise, Idaho

June 12, 1979 - Owyhee County Courthouse, Murphy, Idaho

June 13, 1979 - Little Tree Inn, Twin Falls, Idaho

During the review period, 61 letters were received from federal, state and local agencies, private organizations and interested citizens. Forty-two individuals gave oral testimony at the three public hearings. An Administrative Law Judge presided over the hearings with the testimony recorded verbatim by a court recorder. The BLM Boise District Manager and the Environmental Statement Team Leader comprised the BLM panel at the hearings. A copy of the public hearing transcripts is on file at the BLM Boise District Office.

All letters and public hearing comments were reviewed and considered in the preparation of the Final Environmental Statement (FES).

Response to Letters

Each letter received during the review period is presented in full with a response(s), where appropriate, following the letter. Each substantive comment has been numbered. The response to each comment follows the letter with a corresponding number. The letters are presented in the order they were received.

Only comments that presented new data, questioned facts or the adequacy of the impact analyses and raised questions or issues bearing directly upon the DES were responded to in this ES. The text of the FES was changed to reflect these comments where necessary.

Response to Public Hearing Testimony

All oral testimony was reviewed from the public hearing transcripts. The commenter having a substantive comment(s) is identified with the appropriate number from Table 9-1. Comments are quoted verbatim and followed by the corresponding response.

The treatment of comments are divided into two parts: (1) those comments resulting from letters received during the review period, and (2) those comments resulting from public hearings. Table 9-1 lists the letters that were received and the individuals that gave oral testimony at the public hearings.

TABLE 9-1

Draft Environmental Statement Public Comment and Testimony

Letters From Individuals, Agencies and Organizations

Commenter No.

1. R. B. Anderson
2. Carl Baur
3. Advisory Council on Historic Preservation
4. John C. Arkoosh
5. National Park Service
6. U.S. Forest Service
7. B and H Canal Association
8. Bureau of Reclamation, Pacific Northwest Region
9. Department of Energy, Bonneville Power Administration
10. Corps of Engineers, Walla Walla District
11. State of Idaho Clearing House
12. U.S. Fish and Wildlife Service, Boise, Idaho
13. Idaho Department of Parks and Recreation
14. Heritage Conservation and Recreation Service
15. David H. Griffith
16. Suzanne Lewis
17. William K. Chisholm
18. Idaho Department of Fish and Game
19. Farmers Home Administration
20. Dr. Peter A. Bowler
21. Mr. and Mrs. Don Henderson
22. Idaho Department of Water Resources
23. Roy H. Couch
24. Doris F. Couch
25. Ed Chaney
26. Idaho Wool Growers Association
27. Hammett Livestock Company
28. Gwinn Rice Ranch
29. Chester J. Tindall
30. Bruce Bowler
31. Department of Health, Education and Welfare
32. Idaho Cattlemen's Association
33. Little Pilgrim Irrigation Project
34. Adam H. Blackstock
35. Idaho Wildlife Federation
36. Steven T. Lund
37. Jack McCall and Greg Ruddell
38. Ray Pershall
39. Gooding Sheep Association
40. John C. Arkoosh
41. Michael Arkoosh
42. League of Women Voters of Idaho
43. Owyhee Cattlemen's Association
44. Golden Eagle Audubon Society

45. National Wildlife Federation
46. Little Pilgrim Irrigation Project
47. Mr. and Mrs. Aldrich Bowler
48. Sliman Sheep Company
49. Idaho State Grange
50. Environmental Protection Agency, Region X
51. Mr. and Mrs. Graham Hooper
52. U.S. Geological Survey
53. Twin Falls Canal Company
54. Idaho Department of Lands
55. Soil Conservation Service
56. Idaho Department of Water Resources
57. Federal Highway Administration
58. Idaho Carey Act Development Association
59. U.S. Fish and Wildlife Service, Boise, Idaho
60. Idaho Consumer Affairs, Inc.
61. Federal Energy Regulatory Commission

Individuals Testifying at Public Hearings

<u>Commenter No.</u>	<u>Speaker</u>	<u>Representing</u>
BOISE		
62.	Harold C. Miles	Idaho Consumer Affairs
63.	Marjorie Hayes	Self
64.	Jack McCall	Little Pilgrim Project
65.	Elaine Martin	Idaho Carey Act Development Assn.
66.	R. J. O'Connor	Idaho Power Company
67.	Donald Carnahan	Self
68.	Russell Heughins	Self
69.	James Kevan	Self
70.	Pat Ford	Idaho Conservation League
71.	Quayle Waddell	Self
72.	Kenneth Robison	Self
73.	Jack Streeter	Southwest Idaho Development Assn.
74.	C. E. Brockway	Little Pilgrim Project
75.	Amy Walker	Self
76.	Arthur J. Martin	Little Pilgrim Project
MURPHY		
77.	William Rose	Self
78.	David Pierce	Self
79.	Jack Streeter	Southwest Idaho Development Assn.
TWIN FALLS		
80.	Warren Gleason	River Rural Electric Cooperative
81.	Joseph N. Dilworth	Self
82.	Kerry C. Collins	Little Pilgrim Project
83.	Steve Allred	Idaho Dept. of Water Resources

84.	Ben Cavaness	Lake Channel Owyhee Irrigation Assn.
85.	Arthur J. Martin	Little Pilgrim Project
86.	Henry H. Buchanan	Self
87.	Steve Lund	Little Pilgrim Project
88.	Charles Brockway	Little Pilgrim Project
89.	Terry Martin	Narrows Water District and Dove Springs CA Project
90.	Lloyd Walker	Self
91.	Irene Beard	Utilities Consumer Defense Committee
92.	Doris Couch	Self
93.	Stanley Miller	B and H Canal Association
94.	Carl Nellis	Citizens for Alternatives to Coal Power
95.	Jack Gochnour	Self
96.	Walter Bentzinger	Self
97.	John Faulkner	Gooding Sheep Association
98.	Floyd Phillips	Mesa La Paz Association
99.	Hugo Meyer	Twin Falls Canal Company
100.	Al Fothergill	Idaho Citizens Coalition
101.	Virginia S. Becker	Self
102.	John Peavey	Idaho Water Right Defense Group
103.	Jeff Ruprecht	Prairie Falcon Chapter of the American Audubon Society

5/23/79

1

BLM

I wish to comment on the proposal to allow agricultural expansion in Blaine, Owyhee, & Twin Falls counties.

I see no need for additional farming on presently BLM lands. Idaho farmers are being paid to reduce acreage planted. Added pumping of Snake River water is not desirable from my standpoint as water temperature will rise. Also added electricity charges are not in the best interests of Idaho citizens.

If the status quo can not remain a larger percentage of mixed ownership should remain for upland game throughout the farming areas.

R. B. Anderson
Box 338
Haily Idaho 83883

- 6. Believe yield estimates (1-15) are in line with potential at those elevations. Proportions of kinds of crops, however, vary from that common to Northwest irrigated areas which, for the most part, show a greater portion of the acreage in alfalfa or forages (there is nothing wrong with the rotation if the markets are there for the row crops).
- 7. The approximately 42,000 A.U.M.'s worth about \$800,000 could be replaced by approximately 6,500 acres of alfalfa and, assuming crop values under irrigation at \$450 per acre, the trade in the place of the elevation is logical acres 450 x 111,000 (p. 2-64).
- 8. Mineral resource lost is essentially zero. There are two major items of most serious concern in any new projects brought on by rapidly escalating costs of construction and power.

Addressing construction or reclamation costs first, assume the public paid the total construction cost of \$1000 per acre for southwest Idaho or \$2500 per acre for Washington's East High and the farmers paid the maintenance and energy costs, what are the benefits to the public? Perhaps a question would be one way to make one evaluation of such an enterprise.

What would Japan, Holland, England, Germany, Italy or Switzerland pay for an acre of new land that would produce 15 tons of potatoes, 20 of beets, 80 bushels of wheat?

Recognizing that we have surplus food production for indigenous needs, the reaction of some is to recommend delay of expensive reclamation developments until food needs are more acute. The need of sales of ag commodities for the U.S. balance trade is of utmost importance to many of us. Orderly development of "feasible" projects should continue recognizing that some subsidization of primary construction costs may be recognized. A major problem in selecting sites in any region is the relative productivity of land under consideration. Recognizing that this is not a part of this study but do want to point out that because of climatic differences, yields may vary greatly among potentially irrigable areas of Idaho. Potato yields range around 200 c.w.t. per acre in Jefferson County and in the area to the north while the southwest area under consideration produces over 300 c.w.t. per acre. Your study certainly points out the importance of location of diversions on subsequent downstream power development.

The increasing energy costs and dwindling water supplies certainly point out the necessity of reducing direct high pumping lifts if canal diversions are economically feasible. This is particularly true if such diversions also have capability of off-season storage.



NORTHWEST AGRICULTURAL DEVELOPMENT PROJECT

3600 Main-Suite 1B
Vancouver, Washington 98663
(206) 696-0805

May 29, 1979

State Director
Department of Interior
Bureau of Land Management
Boise, ID 83701

Dear Sir:

I have reviewed your most comprehensive Environmental Statement for southwest Idaho. Certainly all conceivable bases were covered. I present my reactions and also some questions.

- 1. I do not believe that the loss of native wildlife habitat is worthy of concern since you have proposed to leave 37,000 acres as public land within the project. In addition, vast areas to the south, north and west will remain as it is now. Areas along the bluffs will be available to wildlife.
- 2. Wind erosion could be serious in the development years but because of the textures of the soils in the area, stabilization should occur quickly under irrigated agriculture.
- 3. The estimated cost for pumping and conveyance facilities would be \$1000 per acre? (page A-50)
- 4. Assuming irrigation is deemed feasible and the approval by BLM and other agencies is obtained, what are the next steps?
 - a. Would a group of individuals request authorization and funding from Congress for a federal project, or
 - b. Would this be open to individual private applications for the land and necessary permits for water withdrawal either from the river or wells?
 - c. Where duplicate applications for land now exist, how would they be handled?
- 5. In view of the increasing energy cost, the concept of the Bruneau Feeder Canal sounds good. However, there are no cost estimates available for this approach at the time. While delays are always aggravating for someone, in my opinion, the availability of the relative costs of river pumping or diversion is important unless to engineers, even preliminary reviews point to definite advantages to one plan or the other. Perhaps the storage could be used for pumped peaking power also.

Again, a comment not in the scope of this study. Assuming the availability of water as a farmer, a major concern is - are or will the pumping costs for my competitors in Nebraska, Wisconsin and Oregon go up at the same rate as mine? Dry farming (the midwest with its continental climate) cannot replace many of the crops grown under irrigation. California produces 40 plus percent of our canned and frozen fruits and vegetables all grown under irrigation. Washington's apples and Idaho's potatoes are not about to be replaced by the same crop grown under dry farmed conditions. It appears then, that in essence, food costs will have to carry the burden of higher power costs. The evaluating of sites for proposed irrigation development as per your current study, keeping in mind the productive capacity of each area, is an important obligation.

Chapter 8 - Alternates to Proposed Action (8-1). Because the region under consideration is among Idaho's most productive (yield per acre), I would favor maximum development instead of greater development in the less productive areas to the north and east. Again, I refer (or perhaps defer is a more proper term) to the need of more information regarding the Bruneau Feeder Canal and its effects, not only to the feasibility of the 111,000 acres, but the 176,000 acre project.

I will admit the numbers in Table 8-21, p. 8-59, based on minimum development, look good on the basis of 350' lift.

Public costs are a factor that must be considered in any development. Agriculture (new) in this case, often creates lower public costs than the introduction of a large factory to an area.

Table 9 - Appendix A-55 - Production Costs and Revenue, 320-acre farm. This table most importantly points out that approximately 1/3 of the production costs are for the system and energy costs. This again brings to mind the need for the Feeder Canal numbers. Another question that may be injected here is, would it not be to the public benefit for the public to assume the systems cost (not energy or maintenance) in order to ensure a low cost supply of food and commodities for export.

These comments are submitted by me as an interested citizen and not necessarily as one associated with any particular group or organization.

Sincerely
Karl Baur

Karl Baur

KB:skh

Advisory
Council On
Historic
Preservation

3

Arkoosh & Zidan Inc.

Route 1, Box 204
Gooding, Idaho, U.S.A. 83330
(208) 934-5014

4

June 13, 1979

1522 K Street NW
Washington D.C.
20005

Reply to: P. O. Box 25685
Denver, Colorado 80222

COMMENT: Agricultural Development EIS, Boise District

June 8, 1979

Mr. William J. Mathews
State Director, Idaho
Idaho State Office
Bureau of Land Management
Federal Building, Box 042
550 W. Fort Street
Boise, Idaho 83724

Dear Mr. Mathews:

This is to acknowledge receipt of the draft environmental statement for the Boise District Agricultural Development in Southwestern Idaho on June 1, 1979. We regret that we will be unable to review and comment on this document in a timely manner pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969.

Nevertheless, the Bureau of Land Management is reminded that, if the proposed undertaking will affect properties included in or eligible for inclusion in the National Register of Historic Places, it is required by Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320) to afford the Council an opportunity to comment on the undertaking prior to the approval of the expenditure of any Federal funds or prior to the issuance of any license. The Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800.4) detail the steps an agency is to follow in requesting Council comment.

Generally, the Council considers environmental evaluations to be adequate when they contain evidence of compliance with Section 106 of the National Historic Preservation Act, as amended. The environmental documentation must demonstrate that either of the following conditions exists:

I wish, by this comment, to express my concern over two aspects of the Boise District, Agricultural Development EIS.

First, I would hope that no decision based on this EIS would be made to allow agricultural development, if the same would affect grazing privileges within the EIS area, until such time as a finalized grazing EIS has been issued. To do otherwise would not allow for full public comment by the permit holders in the EIS area, nor informed decision making on the part of the BLM.

Second, the implementation of the action proposed would have a negative impact on grazing privileges within the EIS area. Until Monday of this week, I was not aware of this possible negative impact. Several other permit holders of my acquaintance have also admitted to a similar ignorance. Without knowledge of such an impact the opportunity to comment is lost.

John C. Arkoosh
John C. Arkoosh
For Arkoosh & Zidan Inc.

Page 2

Mr. William J. Mathews
Boise District Agricultural Development
June 8, 1979

3



United States Department of the Interior

NATIONAL PARK SERVICE

Pacific Northwest Region
Fourth and Pike Building
Seattle, Washington 98101

5

L7619(PNR)PCC

June 13, 1979

1. No properties included in or that may be eligible for inclusion in the National Register are located within the area of environmental impact, and the undertaking will not affect any such property. In making this determination, the Council requires:

--evidence that the agency has consulted the latest edition of the National Register (Federal Register, February 6, 1979, and its monthly supplements);

--evidence of an effort to ensure the identification of properties eligible for inclusion in the National Register, including evidence of contact with the State Historic Preservation Officer, whose comments should be included in the final environmental statement.

2. Properties included in or that may be eligible for inclusion in the National Register are located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's regulations, "Protection of Historic and Cultural Properties".

Should you have any questions, please call Jane King at (303) 234-4946, an PTS number.

Sincerely,

Louis E. Wall
Louis E. Wall
Chief, Western Office
of Review and Compliance

Mr. D. Dean Bible
District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Mr. Bible:

As requested, we have reviewed the draft environmental impact statement for agricultural development in southwest Idaho and have no comments.

Sincerely yours,

Daniel R. Kuehn
Daniel R. Kuehn
Acting Associate Regional Director,
Planning and Resource Preservation

1920

June 15, 1979



District Manager
Bureau of Land Management
230 Collins Road
Boise, ID 83702

Dear Sir:

Reference is made to your letter requesting review and comment on the draft environmental statement for agricultural development on the BLM Boise District in Southwestern Idaho.

The Boise and Sawtooth National Forests, as well as several staff groups in the Regional Office, have reviewed the document. We have no comments to make, since none of the activities would have any effect on National Forest lands.

Sincerely,

P.M. Rees
P.M. REES
Director, Regional Planning
and Budget

Letter 7 Responses

1. If electricity is used for irrigation pumping, there are two possible alternatives to Idaho Power Company as a source of supply. First would be for individual projects to finance and construct their own generating facilities, for example, small scale hydroelectric facilities. This would be a much more expensive source of energy because the entire cost of the energy supply would fall on the new irrigators rather than the cost being borne mostly by existing IPC customers, as would be the case with IPC supply.

A second possibility would be Bonneville Power Administration power provided through a rural electric cooperative or similar entity. This possibility is very uncertain, and would probably require the establishment of a new public utility, including financing and constructing transmission and distribution system. Under current Bonneville Power Administration law, a public utility would be a preference customer of BPA and entitled to electricity supply ahead of direct service industries and private utilities. However, new legislation that could completely change the availability, distribution and price of BPA power is currently before Congress. One example of the uncertainty of BPA supply for proposed action developments is a provision limiting the size of pump installations that may receive BPA power. Limits of 100 HP and 300 HP have been proposed, both of which would exclude river pump stations.

Electricity was assumed as the source of energy for irrigation pumping primarily because almost all existing irrigation in the area uses electricity. In addition, all of the proposed projects for which engineering studies have been done also indicate the use of electric motor driven pumps. Electricity is apparently cheaper than other conventional sources of energy such as diesel or natural gas, or the projects would be using these other sources.

In addition to being the most likely source of supply, the Idaho Power Company system would be impacted because of the effect of irrigation depletions on Snake River flow. No matter what source of energy is used for running irrigation pumps, irrigation diversions from the Snake River by the proposed action will reduce IPC hydrogeneration which in turn adversely affects IPC customers.

Present and future considerations regarding a comparison of electricity to natural gas or diesel motor driven pumps would include: service life of motors, the cost of distribution (i.e., electric lines vs. natural gas pipeline), the relative availability of fuels (especially diesel) and the fuel cost. Based on these considerations of all the projects both existing and proposed have chosen electricity driven pumps.

In the future it is possible, perhaps even likely, that nonconventional, alternative energy sources such as solar or alcohol may be available for high-lift irrigation pumping. However, as long as the current electricity rate system exists, it is not likely that alternative energy sources will be economically competitive with electricity. The most expensive part of an irrigation system is not the pump or the motor, but the energy delivery system.

In the case of electricity the delivery system is the generating capacity and transmission lines required to run the motor; solar energy delivery systems would consist of solar collectors and heat to mechanical motion mechanisms; in alcohol, the fermentation and distillation system.

2. As stated in the wildlife impacts section, (Chapter 3) much of the wildlife occurring in the proposed agricultural development area would be adversely impacted by this use. There would be adverse impacts to mule deer, sage grouse, birds of prey and many of the animals which comprise their food source, reptiles, and many of the sensitive species which occur in the area.

There would also be beneficial impacts for some wildlife. As pointed out in the impact sections (Chapter 3) dealing with California quail, Hungarian partridge, mourning dove, pheasant and in some instances, waterfowl, significant beneficial impacts to these birds would lead to increased populations. A preface to each of the stated beneficial impacts in these sections is that the proposed DLA and CA farm development be intermingled with tracts of native vegetation (as stated in the proposed action described in Chapter 1) which would provide important wildlife cover at certain times throughout the year.

3. Yes, the Saylor Creek horses are unclaimed and as such, they are considered wild. Public Law 92-195 (See 2(b)) defines wild free-roaming horses or burros as...."all unbranded and unclaimed horses and burros on public lands of the United States."

Section 10 of the Act further states "Nothing in this Act shall be construed to authorize the Secretary to relocate wild-roaming horses or burros to areas of the public lands where they do not presently exist." The Saylor Creek wild horse range encompasses the known territorial limits of the horses as mandated by Section 2(c) when the Act was passed in 1971. It would be in conflict with the Act to cut down their area of use.

4. The purpose of writing this ES was not to analyze specific DLA and CA farm project proposals. This would be an impossible task, since there are about 32 group project proposals within the study area, many of which have overfiled each other for the same land (see Map 1-3). This document was developed to analyze those impacts associated with high-lift pumping from the Snake River as this is the type of development that is proposed by the majority of DLA and CA applications on file. This ES emphasizes electrical energy impacts that would result from high-lift farming since this is considered a major concern for future development. But again, the purpose of the ES was not to analyze particular project proposals. This will be done if decisions are made to make land available following completion of the final ES.

4200-11 (1/64)

7

DISTRICT MANAGER B.L.M.
230 COLLINS ROAD
BOISE, IDAHO. 83702

Dear Sir;

We would like to comment on the Agricultural Development Environmental Statement.
These comments represents the comments of 112 people, whose names and address are attached.
In reading this statement we find no basis of fact.
It is based strictly on assumption and very often refers to other reports which are based also on assumption.
We find it biased and hypothetical, with no basis for common sense.
We find it a senseless, useless bunch of nonsense, and brand it one more piece of harrasment to stall the settlers who have filed on these lands and are who are waiting to develop family type farms.
There was a great deal of space devoted to assuming what role Idaho Power Company would play, but we seen no space devoted to the alternatives to idaho power, and there are several alternatives to idaho power.
There was space devoted to the assumed adverse impacts it would have on existing farmers, but we did not see anything about the adverse impact it is having on the settlers who are being stalled and harrassed while they wait for some rabied government fools to make senseless, useless studies of the land they have a right to be farming.
There was a great deal of space devoted to the various types of wild life and assuming the impact development would have on them, but there was nothing written of the wild life being able to adapt to the change of invirment, nor that development would enhance the conditions of many wild life spieces.
We find projects being held up because of a supposedly wild horse range in the saylor creek area, these are not wild horses nor have they ever been nor will they ever be, the B.L.M. themselves admit they are unclaimed horses left by ranchers in the area.
We request this so called wild horse range be moved or cut down in size so as not to hold up these projects.
We find that some of the projects with in the study area were left out of the study completly and we feel these projects should be included in the study.
We believe the federal employees have gone way beyond there scope and authority since the State is entitled to this land by an act of congress.
The settlers who filed on this land is entitled to it under the law without all this harrasment and stalling that is being forced upon them.
Again we point out the whole study is based on assumption by people that we question having the ability or the qualifications to make such a study and base it on facts, being unbiased and without prejudice.
We ask that these projects be allowed now without any further harrasment, stalling, or further senseless useless studies.
The study deals with the adverse impacts but fails to consider the good impacts, such as food, fiber and homes for people and families.

B. and H. CANAL ASSOCIATION

There were a number of comments on the DES concerning development by off-stream storage. This concept is described in general terms in Appendix 8-2 of the FES. It is too early to do a comprehensive analysis of any off-stream storage projects because they are still in the planning and feasibility stages.

5. A number of comments on the DES argued that the Secretary has no discretion to reject State Carey Act applications, that he is bound by decisions of the U.S. Court of Appeals for the Ninth Circuit on this matter, which was described in the revision of pages 1-4 and 1-5 of the DES, that the description of the court decision is inaccurate, and that other laws which apply to discretionary federal actions do not apply to Carey Act grants.

The contentions concerning discretion under the Carey Act are at issue in the law suit. The circuit court decision is not final and binding on the Secretary because the United States filed a petition for a writ of certiorari (i.e., has sought review) with the Supreme Court on August 16, 1979. The Court has granted the petition and it will decide the case.

The Office of the Solicitor has reviewed the description of the circuit court decision and has found that it is accurate.

P. 3-1, Item 1. The total diversion of 2.58 acre-feet per year seems reasonable for the area, assuming full-pressure sprinkler systems and/or ideal conditions. However, since a need for peaking capacity would allow a greater diversion amount, it is more than likely the total diversion could be as high as 3.0 acre-feet comparable to surrounding areas. The worst year (drought) prediction is 3.5 acre-feet. Because of the importance of the diversion rate in determining remaining Snake River flows and energy requirements, it would be helpful if the assumed diversion rate were presented in the EIS.

P.3-2, Item 12. It would be useful to specify where the pressure of 70 psi is scheduled to be.

Pp. 3-25 - 3-27, Raptors. Many of the adverse impacts to raptors appear to be overstated and might not actually occur with this proposed action. It is suggested that this section be revised to provide a more thorough evaluation of the effects of the proposal. It should be considered, for example, that some raptor species such as the kestrel and barn owl may benefit from development.

P. 3-32, Impact Summary. It is difficult to evaluate the significance of most of the wildlife impacts because only the numbers being lost are given (8 nest sites, 1 strutting ground, etc.). Numbers available in the study area should also be given so that the reader can draw his own conclusions as to the significance of some of the impacts.

Pp. 4-1 - 4-3, Mitigation Measures. Mitigating measures associated with the proposed action appear to be quite limited. It would seem that perhaps other measures could be taken to lessen impacts. For example, sage grouse strutting grounds and the adjacent area could be precluded from development, vegetation on the remaining mule deer wintering ground could be upgraded to carry the displaced animals, watering facilities could be built on adjacent desert lands to increase its carrying capacity, etc. It would be helpful if this chapter were revised to include additional measures to lessen the impacts of development.

We appreciate this opportunity to provide our comments and hope you will let us know if we can be of further assistance in the review process.

N. R. Stevens

cc: Commissioner, Attention: Code 150
Director, Office of Environmental Project Review, Department of the Interior



United States Department of the Interior

BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION
FEDERAL BUILDING & U.S. COURTHOUSE
BOX 945-550 WEST FORT STREET
BOISE, IDAHO 83724

IN REPLY
REFER TO 150

JUN 15 1979

Memorandum

To: District Manager, Bureau of Land Management, Boise, Idaho
From: ACTING Regional Director, Bureau of Reclamation, Boise
Subject: Review of Draft Environmental Statement on Boise District Agricultural Development for Southwest Idaho

We have reviewed the subject environmental statement and have the following comments.

General

The EIS appears to be generally well written and thorough, but appears to be somewhat biased against agricultural development. Adverse impacts are discussed in great detail whereas beneficial impacts (e.g., to certain game species of wildlife) are only briefly mentioned.

Additionally, given the potential for change in economic conditions and considerations involved in developing the needed supply of electric power, it might be well to indicate whether the 1980-84 time schedule could be adjusted to meet these and other possible contingencies.

Specific

P. 1-15, Farming Practices: Seemingly, a side roll sprinkler type system was used in the evaluation. As an alternate or comparison, it might also be useful to mention the center pivot system.

P. 1-16, Crop Information. It appears that the consumptive water use for sugar beets and alfalfa is low, and you may want to recheck the figures.

P. 1-17. It appears that the photographs are reversed.

Letter 8 Responses

1. In the electricity consumption estimates, there would be tradeoffs between operating pressure and water application efficiency when comparing sideroll and center pivot systems. In practice, pivots are probably slightly more efficient in water applications but operate at higher pressures which require more energy. The effect on the energy consumption estimates of assuming pivots would be minimal if water requirements were lowered slightly to account for greater efficiency. For all of the work in the Environmental Statement Draft--water quality, fisheries, energy, etc.--a diversion rate of 2.58 acre-feet/acre (per the Idaho Department of Water Resources) was utilized. Holding the water requirement constant and substituting a value for pressurization head based on a project average of 90 psi at intakes to pivot lines would result in an electricity consumption estimate of 391 million KWH for the proposed action, compared with the estimation of 374 million KWH using 70 psi.

2. The information shown in Table 1-5 is based on consumptive irrigation water rates used in the three counties in the ES study area. The figures have been rechecked and validated by two reputable agencies--Idaho Department of Water Resources and the Elmore County Extension Service.

3. The photo captions have been corrected in the FES.

4. The diversion of 2.58 acre-feet per acre per season is assumed for average weather conditions and the five crop rotation described in the ES (Chapter 1). For electricity consumption estimates, pressurized pipe was assumed for the system from water source to sprinkler lines. Thus, there is no allowance for evaporation or seepage losses associated with canals.

Pump stations were assumed to be sized to be able to deliver peak water requirements. Pump stations were also assumed to be associated with large cooperative irrigation projects and to consist of multiple pumps. As a result, pump stations were assumed to be operated to deliver only actual water requirements at any time. In practice, large pump stations consist of multiple 1000-1500 HP motors with perhaps a single 500-700 HP motor. Thus the pump station can be operated at the lowest HP combination of motors that is equal to or greater than that necessary to deliver the water required at the time. For example, a water demand requiring 7800 HP would be met by operating five 1500 HP motors and one 500 HP, or 8000 HP.

The electricity consumption estimates are directly proportioned to water diverted.

If seasonal water diversions totalled 3.0 acre-feet/acre rather than 2.58 acre-feet/acre as suggested by the comment, the estimated electricity consumption for the proposed action would be increased from 373.8 million KWH to 434.7 million KWH, about 16.3 percent.

Letter 9 Responses

10

1. According to data from IDWR computer runs, the maximum development (176,000 acres) flow reduction caused at Anadone in the irrigation season will be less than 1 percent in April and May, and less than 4.6 percent in September during a normal water year. Of themselves, these reductions do not pose a threat to anadromous fish resources. In combination with other potential developments, cumulative reductions of flow do pose serious threats to anadromous fish resources.

2. This section has been changed in the FES to reflect the comment.

3. The FES text has been changed accordingly.

4, & 5. The statement in the Environmental Statement text is based on the Bonneville Power Administration "Draft Environmental Statement" (July 22, 1977), Appendix A, pgs. I-1, I-2:

"As of June 30, 1976, BPA marketed electric power generated at the 29 hydroelectric projects which, with the BPA transmission system, comprise the Federal Columbia river Power System. BPA takes into its system and markets output from the Washington Public Supply System's Packwood hydroelectric plant and Hanford nuclear steamplant. BPA also takes into its system and markets part of the generation from the Pacific Power & Light Company's Centralia steamplant, Portland General Electric Company's Trojan nuclear steamplant, and Grant county PUD's Priest Rapids hydroelectric plant."

6. FES text has been corrected.

NPWEN-PL
District Manager

24 May 1979

We appreciate the opportunity to review and comment on this draft statement.

Sincerely yours,

W. E. SIVLEY
W. E. SIVLEY
Chief, Engineering Division

2



DEPARTMENT OF THE ARMY
WALLA WALLA DISTRICT, CORPS OF ENGINEERS

Bldg. 602, CITY-COUNTY AIRPORT
WALLA WALLA, WASHINGTON 99362

NPWEN-PL MAY 29 1979

Bureau of Land Management
Boise District

District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

24 May 1979

10

1	DM	
2	A/OM	
3	RPM	
	OPER	
	ADM	
	CASC	
	BRUN	
	OWY	
	JARB	
	LAND	
	LIB.	
21	W. E. SIVLEY	
	Action:	
	Comments:	

Letter 10 Responses

1. The canal proposal to which you refer was, and still is, a concept idea. There is no engineering feasibility done and no project to base an ES analysis on. Therefore, gravity diversion and off-stream storage proposals could not be included as alternatives.

As you are aware by now, the Bruneau Plateau Water Development Project (gravity diversion and off-stream storage) will be under study over the next few years. The first phase will be a multi-agency feasibility study/ES and will be done specifically on the project over the next two or three years. This type of development may prove to be more feasible than high-lift pumping.

There have been a number of comments on the DES concerning irrigation development by off-stream storage. This concept is described in general terms in Chapter 8 of the FES. Once the feasibility of that proposal is determined, it could be that a full EIS would be warranted.

2. The FES text has been slightly changed.

Dear Sir:

This is in response to the letter from the BLM Idaho State Office requesting comments on the Boise District Agricultural Development Draft Environmental Statement.

We have reviewed the statement and find it to be quite comprehensive on impacts associated with irrigation development through pumping. The statement, however, fails to adequately address impacts associated with irrigation development through gravity diversion and off-stream storage. Although potential off-stream storage near Grindstone Butte, with a diversion canal leading from Milner Dam, is mentioned on pages 1-24 and 2-88, this alternative is not considered in either the economic analyses or electric power impacts, and is not addressed as an alternative in Chapter 8. A large portion of the land projected for development could be served by this alternative which is now being studied by the Idaho Department of Water Resources, the Bureau of Reclamation, and the Corps of Engineers.

One specific comment applies to page 2-47, paragraph 3. We do not believe that flows in average-flow years "are inadequate for unimpeded and safe migration of anadromous fish." The main-stem Snake and Columbia River dams, from Lower Granite downstream, are run-of-the-river projects with very limited storage capacity. The flows in that stretch of river must be passed as they occur with some limited adjustment around the average due to power peaking.

Should development eventually take place, Corps of Engineers permits for work or structures in streams may be required. Information on permits can be obtained by contacting:

Chief, Navigation and Flood Control Branch
Walla Walla District, Corps of Engineers
Bldg. 605, City-County Airport
Walla Walla, Washington 99362
Phone: (509) 525-5500, Ext. 631



State Of Idaho

DIVISION OF BUDGET, POLICY PLANNING AND COORDINATION

EXECUTIVE OFFICE OF THE GOVERNOR

STATE CLEARINGHOUSE

JUNE 18, 1979

JOHN V. EVANS
Governor

Statehouse
Boise, Idaho 83720

DISTRICT MANAGER
BUREAU OF LAND MANAGEMENT
230 COLLINS ROAD
BOISE, IDAHO 83702

THE STATE CLEARINGHOUSE HAS COMPLETED REVIEW OF THE BLM'S BOISE DISTRICT AGRICULTURAL DEVELOPMENT DRAFT ENVIRONMENTAL STATEMENT FOR SOUTHWEST IDAHO (OUR SAI #01281583 & 01281642). THE FOLLOWING AGENCIES WERE ASKED TO SUBMIT COMMENTS ON THE DEIS:

- REGION IV DEVELOPMENT ASSOC, TWIN FALLS
- IDA-ORE REGIONAL PLANNING & DEVELOPMENT ASSOC, WEISER
- ID DEPT OF LANDS
- ID DEPT OF AGRICULTURE
- ID DEPT OF PARKS & RECREATION
- ID DEPT OF FISH & GAME
- NATURAL RESOURCES BUREAU; DIVISION OF BUDGET, POLICY PLANNING & COORDINATION

NO COMMENTS WERE RECEIVED FROM REVIEWERS. SHOULD LATE REVIEWS BE SUBMITTED TO THE STATE CLEARINGHOUSE, THEY WILL BE FORWARDED TO YOU.

THANK YOU FOR YOUR EFFORTS IN THE EIS REVIEW PROCEDURES OUTLINED BY THE STATE CLEARINGHOUSE. PLEASE SEND THE REQUESTED NUMBER OF COPIES TO AGENCIES ON THE MAILING LIST SUBMITTED IN JANUARY 1979.

YOUR COOPERATION IN THE REVIEW PROCESS IS APPRECIATED.

SINCERELY,
Pam Demo-Rybus
PAM DEMO-RYBUS
COORDINATOR

EQUAL OPPORTUNITY EMPLOYER



United States Department of the Interior

12

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES

4620 Overland Road, Room 209
Boise, Idaho 83705

June 19, 1979

TO: District Manager, Bureau of Land Management,
Boise

FROM: Field Supervisor, ES, Boise

SUBJECT: Boise District Agricultural Development
Environmental Impact Statement, Reference 1792
(EC #79/23)

General Comments

The draft statement in general adequately describes fish and wildlife and their associated habitats. It also accurately describes most impacts of the proposed action on fish and wildlife. However, in a few instances detrimental effects were minimized or were not recognized.

Specific Comments

Page 3-23, last paragraph, last sentence: The description of the overall effect is an extreme understatement and should be revised. Population reductions would be certain to occur, and they would be substantial. | 1

Page 3-25, third paragraph: Low flows in the Snake River could create land bridges between islands and the shore, thus allowing more extensive predation and disturbance to nesting waterfowl. This effect should be included in the discussion. | 2

Page 3-34, sixth paragraph, first sentence: This statement is arbitrary and unsupported by fact. Low flow years could have an impact on the reproduction of white sturgeon. However, not enough is known to predict the extent or intensity of these effects. | 3

Conclusion

Page 5-3, Alternative 4: FLPMA Lease: This alternative under the Federal Land Policy and Management Act of 1976 would be the most favorable alternative for the protection and enhancement of fish and wildlife resources.

We appreciate the opportunity to comment on this document.

Walter D. Ray
for Richard J. Fisher

cc: FWS/OEC, Washington, D. C.

Letter 12 Responses

1 & 2. Agreed, the FES has been revised to reflect your comments.

3. Based on studies of larval white sturgeon and sturgeon reproduction in California, and on reproduction of other sturgeon species in Russia, all of which indicate that sturgeon spawn in deeper portions of river channels, it is felt that white sturgeon reproduction is unlikely to be affected by the flow changes caused by the projected development low-flow years—or in average-flow years.



Save Energy and You Serve America!

R. Christiansen, Director
 Peterson, Deputy Director



John V. Evans, Governor

Letter 13 Responses

1. The ES maps have been corrected as suggested.
2. The Malad Gorge State Park is about 2 1/2 miles outside the boundary of the ES study area. Therefore, it is not necessary to illustrate it on the ES map exhibits.
3. Agreed, the text has been revised accordingly.
4. The spelling has been corrected.

June 18, 1979

Mr. Dean Bibles
 District Manager
 Boise District Office
 Bureau of Land Management
 230 Collins Rd.
 Boise, ID 83702

Re. - Boise District Acquisition
 Development Draft E.S. for
 Southwest Idaho

Dear Mr. Bibles:

As the state's designated outdoor recreation planning agency, we have reviewed the Boise District's agricultural development draft environmental statement as to its impact on the overall outdoor recreation opportunities in this area of Idaho. The following general and specific comments relate to areas we feel should be considered.

As a general statement, we would suggest that minor corrections be made to all the maps and exhibits that are shown in the report. In the eastern part of your planning area boundary is an area known as the Hageman Horse Quarry. The ownership that is shown on all of your maps is that of being federal ownership. There is one section located in Township 7 South, Range 13 East, Section 16 which belongs to the State Parks & Recreation Department. Although this area is now under interagency management agreement with the Bureau of Land Management, the actual ownership still remains with the State of Idaho.

Secondly, we would recommend that Malad Gorge State Park be shown as existing on all of your map exhibits. The Malad Gorge State Park (a proposed national landmark) is located just east of Bliss, Idaho in Township 6 South, Range 13 East, Sections 35 and 36, (on the immediate edge of your project boundary on the Malad River).

On page 2-95 reference is made to the recreation opportunities that would be a result of the Wiley and Dike Dams being constructed. Reference was made that water skiing would be one of the major recreation opportunities along with power boating. Because of the narrowness of the canyon behind the location of the Wiley Dam site, we would not expect to see major use of that area being made for water skiing and power boating. At present, consultants for the Idaho Power Company have

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EQUAL OPPORTUNITY EMPLOYER

Page #2

considered the narrowness of the canyon and have initially recommended that a horse power limitation be made and that the area be managed for fishing and nature study. These two power site construction projects would also have adverse impacts on current recreation opportunities in the form of whitewater boating, rafting, and canoeing particularly in the Wiley stretch. Although these projects are not subject for discussion in this environmental statement, they would have impact on the river corridor itself and indirectly on the availability of waters to be used should any Carey Land sites be developed or desert entry lands developed.

On page R-4 we would recommend a correction in the name of the person as shown. The correct name is Chuck Wells not Chuck Willis.

On page 2-95, discussion shows that ORV use does occur on a major portion of the project area. ORV recreation is particularly important in the areas immediately below Glens Ferry and Hammett, along the Hageman Horse Quarry site and around the Reynolds Creek area, close to Silver City. These three areas offer perhaps the greatest current recreation opportunities to the ORV user during the early and late season ORV use periods.

We feel that the Minimum Development Alternative would have the least adverse impact on the overall recreation opportunities that currently exist and would exist in the future. Our outdoor recreation planning program has found that ORV recreation, particularly trailbiking is increasing at an accelerated rate in southern Idaho. We anticipate that even with the shortage of fossil fuels, that this form of recreation activity will continue its growth rate and perhaps may even grow faster as a result of a shifting of recreation patterns from larger vehicle recreation such as four wheeling to the trailbiking recreation.

We thank you for the opportunity to review the environmental statement and hope that our comments will help contribute to your task of refining this report and distributing it again in the future.

Sincerely,

DALE R. CHRISTIANSEN
 DIRECTOR

William G. Hagdorn
 William G. Hagdorn, Chief
 Comprehensive Planning Bureau

jm

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4



(206) 442-4706

ER-7

Memorandum

To: District Manager, Bureau of Land Management,
 230 Collins Road, Boise, Idaho 83702

From: Regional Director, Heritage Conservation and Recreation Service

Subject: Review of draft environmental statement for agricultural development, Southwest Idaho

We have reviewed the subject DES as requested in your transmittal letter, and offer the following comments for your consideration when preparing the final environmental statement.

The draft statement contains a thorough presentation of cultural resources and adequately describes planned procedures to identify and preserve properties according to 36 CFR Part 800. We strongly support your proposal to leave undeveloped a strip up to one mile wide along visible portions of the Oregon Trail and Kelton Road. These trail segments have high potential for historic interpretation and recreation. Realizing this potential will depend largely on preserving the natural appearance of land along the trail, in order that the public may recapture a feeling for the landscape as it was during the period of emigrant travel.

Maurice H. Lundy
 Maurice H. Lundy
 Regional Director

UNITED STATES
 DEPARTMENT OF THE INTERIOR
 HERITAGE CONSERVATION AND RECREATION SERVICE
 NORTHWEST REGION
 915 SECOND AVENUE, RM 990
 SEATTLE, WASHINGTON 98174

JUN 14 1979

14

June 19, 1979

David H. Griffith
P.O. Box 656
Sun Valley, Idaho 83353

15

June 21, 1979

William K. Chisholm
Rt. #3
Buhl, Idaho 83316

17

District Manager
B.L.M.
230 Collins Road
Boise, Idaho 83702

Dear Sir:

I am writing to comment on the draft E.I.S. concerning agricultural development on public lands in southwest Idaho.

Compelling facts throughout the statement argue against any new farm development at this time. Consider the cost/benefit analysis for:

1. Current farmers
2. Current taxpayers
3. Idaho Power customers
4. Future farmers on the proposed site.

In all above examples -- and no doubt many others -- the costs far outweigh any marginal benefits. The current major beneficiaries appear to be the distant consumers of agricultural commodities (benefitting from prices driven down further by overproduction) and Idaho Power, beneficiary of a large capital investment required to provide the enormous quantities of electricity required.

The middle ground proposal for the development of 111,000 acres recommended in the E.I.S. merely cuts the losses to those most directly affected.

It is time to throw out the attitudes and assumptions inherent in the D.L.A. and Carey Act. Large areas of America's desert are now both populated and bountiful. There can be no present justification for the enormous subsidies, public and private, direct and indirect, required to develop that land. Cheap agricultural land, like cheap energy, is now part of America's past.

I urge you to adopt alternative #3: no development. This project could be undertaken in the future should the demand for agricultural commodities and the financial feasibility of all affected dictate development.

Prior to that time, I suggest that you advise individuals filing claims in the affected area to contact available parties, of which there are many, to purchase land in Bell Rapids and Indian Creek -- lands now unprofitable to farm because of low crop prices and high energy costs. Make certain the equations work before future commitments are made.

Sincerely yours,

David H. Griffith

Mr. Dean Bibles
District Manager
BLM
230 Collins
Boise, Idaho 83702

Dear Mr. Bibles,

A couple of years back I attended a conference on opening up more public land for development in southern Idaho. The conference, which I'm sure you are aware of, was sponsored by the Idaho Conservation League and featured expertise in several fields, from economics to energy, engineering to environmental. The answer was obvious, the development is too costly on several fronts and it is not needed at this time.

I don't believe much has changed since that conference. BLM's own study speaks of a potential cost increase of energy of up to 30 percent for the public to in essence subsidize this development. Other factors have not changed, there is still no need for the additional acres. Why is our country so obsessed with development? What is to be left to future generations? I urge BLM to leave the land as it is, to manage it wisely, to move slowly in conversion so that the long term needs of the whole is not sold out to the short term gain of the few. We call it public land, it should be managed as such.

Please enter this letter in the public testimony and consider it when making the final decision.

Respectfully yours,

William K. Chisholm

June 21, 1979

Dean Bibles
Boise District Manager
230 Collins
Boise, Idaho 83702

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Dear Mr. Bibles:

As a native Idahoan my heart and soul loves this beautiful land please consider this plea to "leave the land as it is" concerning the Desert Land Entry Act [Crawley]. Enough land has been converted to farm land. The birds of prey and other wild animals deserve to have their homes and feeding grounds preserved!

Thank you for taking the time to hear my words.

Suzanne Lewis

Rt. #3
Buhl, ID 83316



STATE OF IDAHO

18

DEPARTMENT OF FISH AND GAME 600 SO WALNUT ST. P.O. BOX 25
BOISE, IDAHO 83707

June 19, 1979

Mr. Dean Bibles
District Manager
Bureau of Land Management
230 Collins Road
Boise, ID 83702

Dear Dean:

We have completed our review of the Boise District Agricultural Development draft environmental statement for Southwestern Idaho, and are submitting the following comments for your consideration.

The draft document generally covers the broad spectrum of anticipated impacts to fish and wildlife resources that will result from the proposed action. There are, however, some impacts which were not adequately addressed, especially pertaining to fish populations and habitat. Reduction of water flows in the Snake River by increased agricultural withdrawals can cause severe degradation of sturgeon and other game fish habitat.

If the proposed action were carried out it would significantly reduce the capability to achieve all of the goals and objectives as outlined in our statewide Fish and Wildlife Policy Plan. Although the proposed action could result in increased habitat for pheasants, there would be varying amounts of habitat losses to sage grouse, antelope, deer, raptors and other species that are basically dependent upon a desert-type biome, along with losses to fishery resources resulting from decreased water flows in the Snake River. In order to minimize these adverse impacts as much as possible, we would prefer to see any lands that may be developed managed as outlined in Alternate 4, Federal Land Policy and Management Act Lease. Such leases would provide for flexibility and control of agricultural development as well as some protection for recreation, cultural, soils, visual and fish and wildlife resources.

The following specific comments pertain to the text of the document:

Chapter 2, Description of the Environment

Upland Game Birds

Page 2-31, paragraph 7 - There is some question whether California quail are native to Idaho. Suggest the reference to this species as being native be dropped. To be consistent, mountain quail should probably also be mentioned in this section.

Page 2-33, paragraph 1 - Reynolds Creek and Castle Creek are not principal pheasant concentration areas. They both would have to be rated as marginal. In the vicinity of the environmental statement area, the primary pheasant producing area is from Marsing to Homedale (Oregon border). The thin belt of farmland from Bruneau to Grandview is also a pheasant producer but not as great as the areas near Marsing and Homedale.

2

Waterfowl

Pages 2-33 and 2-34 - This section needs to be expanded. The importance of the Snake River to ducks and geese is not adequately identified. Goose nest surveys on the river segments involved are run by the Department of Fish and Game and the U.S. Fish and Wildlife Service every year from Marsing to the Oregon border. Nest surveys are also run biennially from Walters Ferry to Marsing. The reference to 1978 appears as if it were the only year the survey was run. If you use the 1978 nest data, the section from Marsing to the Oregon border should be included, i.e., 114 active nests in 1978.

3

The first paragraph on page 2-34 implies that all the nesting geese are migrants. This is probably true for the river section above C. J. Strike; however, the nesting geese from Walters Ferry downstream are predominantly nonmigrants.

It should also be mentioned that major winter resting areas for waterfowl occur at C. J. Strike Reservoir and Lake Lowell. Even though out of the ES area, any increase in farmland in the river section from Bruneau to Marsing would provide more feeding areas for ducks and geese using these nesting waters, especially if corn or cereal grains were planted.

Sensitive Species

Trumpeter Swan

Page 2-38, paragraph 6 - This should be whistling swan. We do not know of any trumpeter swans utilizing any area in southwestern Idaho. The breeding area of the whistling swan should not include Idaho, Montana or Wyoming.

4

Mountain Quail

Page 2-38, paragraph 7 - The reference to mountain quail being native to Idaho should be dropped. Mountain quail can also be found in Reynolds Creek.

5

Burrowing Owl

Page 2-39, paragraph 5 - Foraging areas for the burrowing owl are not shown on map 2-6 as stated. These areas should be added to the map.

6

Fisheries

Page 2-42, table 2-9 - The white sturgeon (*Acipenser transmontanus*) is not included in the checklist of game fish.

7

Fisheries

White Sturgeon

Page 3-34 - (Low Flow Years) - We do not believe that the effects of the proposed action on white sturgeon are as well known as this section indicates. To our knowledge, no one knows where, or at what depth, sturgeon spawn in this stretch of the river, or where the larval sturgeon rear. Therefore, we question the conclusion that the proposed action will have no effects on sturgeon reproduction.

14

There are only very limited data on sturgeon growth rates and feeding habits in the Snake River. If the growth rates are similar to those found for white sturgeon in the Middle Snake, then even a slight decrease could severely affect the ability of the juvenile fish to reach maturity. (Our Department is presently conducting a research project in this stretch of the river to identify some of these unknowns.)

Chapter 5. Unavoidable Adverse Impacts

Wildlife - Fisheries

Pages 5-2, 5-3, 5-4 - The significant adverse impacts listed in this section should be updated as stated in our previous comments on chapters 2 and 3. The mitigative measures as stated in chapter 4 are inadequate and provisions should be provided to adequately compensate for these losses.

15

References

Page R-7 - Corrections should be made to the following titles of Department of Fish and Game personnel, cited as references: D. Paul Hanna should read 'Regional Wildlife Biologist' and G. Darold Morgan should be 'Conservation Officer.'

16

Thank you for the opportunity to provide comments on this document. We look forward to working with your personnel in providing the necessary data for preparing the final statement.

Sincerely,

DEPARTMENT OF FISH AND GAME

Joseph C. Greenley
Director

Letter 18 Responses

Abundance of Fish

Page 2-45 - No mention is made in the text of the abundance of white sturgeon in the Snake River. These data should be included.

8

Recreation

Pages 2-55 and 2-58 - C. J. Strike Reservoir is not mentioned as a waterfowl hunting area, sailing is not on the list of water uses and Strike WMA and other Department of Fish and Game access sites along the river are not mentioned. This may be because C. J. Strike Reservoir is just outside the ES area; however, some parts of the report make note of effects on the reservoir so it should be included.

9

3. Environmental Impacts

Big Game

Page 3-20 - Impacts to wintering mule deer in the area north of King Hill will be greater than described. This general area supports several hundred wintering animals, not the 40 to 60 estimated. Loss of 1,000 acres, along with the disturbance factor related to development, can jeopardize this wintering population. There should be no agricultural development permitted in this area.

10

Sage Grouse

Page 3-23 - The impacts on sage grouse, related to proposed agricultural developments north of King Hill, are not correctly addressed. Displacement of these birds, along with losses of cover, strutting grounds and nesting areas, will have severe impacts. To state, "This may lead to slight population reductions" is not factual. Losses will be greater than the 20 to 50 birds estimated.

11

Waterfowl

Page 3-25 - Adverse effects on waterfowl resulting from reduced water flows in the river are not addressed. Many of the islands are used by waterfowl for nesting. Decreased water levels creating land bridges between the mainland and the islands can result in increased predation and disturbance to nesting birds.

12

Trumpeter Swan

Page 3-28 - This should be corrected to read Whistling Swan.

13

1. The reference to the California quail as being native to Idaho has been dropped. The format we have followed deals with all sensitive species in the "sensitive species" section, for this reason mountain quail are discussed in that section. References to mountain quail as being native to southwestern Idaho has also been dropped.

2. The FES text has been changed.

3. The comment dealing with islands in the Snake River, their importance to nesting waterfowl and results of nesting surveys has been incorporated in the FES text.

The comment regarding migrant and non-migrant geese has also been clarified in the text.

The comment dealing with farmland adjacent to wintering populations of waterfowl and its use as feeding areas is discussed in Chapter 3 under the waterfowl section.

4. Any reference to the trumpeter swan in the FES has been dropped.

5. Reference to the mountain quail as being native to southwestern Idaho has been dropped. Mountain quail distribution in Reynolds Creek has been added.

6. In preparing Map 2-6 all known raptor nests were plotted. In order to define foraging areas, a circle with a specific radius was drawn around each nest, the length of the radius depending upon the species. Burrowing owl nests had the smallest foraging radius drawn around them. As a result, all burrowing owl foraging areas were overshadowed by other species such as prairie falcons and golden eagles which had significantly larger foraging areas. For this reason individual burrowing owl foraging areas do not appear on Map 2-6 but do fall within the depicted raptor foraging area.

7. The table has been revised.

8. The FES text is revised.

9. Agreed, the FES text is revised.

10. There are a large number of mule deer that winter in this area and in Chapter 2 it was pointed out that an estimated 500 deer use this area in the winter. Approximately nine percent of that portion of the winter

I am opposed to further development under the Carey or Desert Land Acts, and similarly the FLPMA lease, sale or exchange program options - in other words I oppose any further development in the ES area under these alternatives. We do not have the water, energy, or need in the public interest to undertake this kind of speculative project with so many compelling inevitable negative impacts (chapter 5 should be carefully studied as it clearly outlines serious problems for southern Idaho if this project is approved). Undoubtedly during the early years, the developers, a small segment of the public, would benefit, but within five years crop prices would be driven so low that I don't see how either new or old farms could make it. I've watched farms go broke at Bell Rapids. There is no way that Idaho can support this kind of project and survive - we have neither the water, energy, or economy to stand this kind of growth boom, and I can see no way that it can be construed to be in the public interest.

Thank you for your consideration.

Respectfully,

Peter A. Bowler
Peter A. Bowler, Ph.D.

Star Rt.
Bliss, Idaho
83314

1-3 paragraph 3. The magnitude of the proposed action will likely be used as justification for further electrical generating facilities. It is a copout to not consider the environmental impacts of proposed dams (Wiley and Dike) or a coal fired plant in this context. In general this document doesn't really cover the severity of the proposed action's reduction in water flow or the impact upon the remnant free-flowing reaches of the Snake River.

1-6 paragraph 1. Although it is stated that this ES is not "site specific", that is what is needed. It is very easy to make broad-brush estimates of impacts, yet how can this be done without site specific field surveys? Without data on specific situations (such as field data on species abundance, diversity, and distributions) a scientifically valid statement cannot be reached.

1-6 paragraph 2. My analysis of this document suggests that the proposed project would spell economic death for existing farmers (especially small operations) and would cause a water and energy crisis which would have severe ripples across the northwest. It is not in the public interest.

1-7 (Time Frame) This kind of "boom" development wrecks havoc on rural towns and begins a false economy from which it is hard for small towns to recover when the construction phases are completed. Small towns along the Snake River are finally recovering from the construction boom from the post war wave of dam building. Flooding the market with a short-lived construction boom lets small towns down hard.

1-23 (Wiley and Dike Dams) The implication here is that this project would be used as justification for the construction of high-cost, low production hydro projects on the few residual fast flowing reaches of the Snake River. If that issue is surfaced, this document should treat the environmental impacts they would cause, which would be profound. Because of the costliness of the projects, the marginal geological situations, and the significance of these ecological refugia since over 70% of the Snake is already dammed, it is not likely that these projects will ever be constructed. This document should treat all of these factors and especially the environmental impacts. It is very misleading to suggest that Wiley & Dike would generate 75 and 50 megawatts, when in fact they would only realize 36.5 and 25 megawatts 90 percent of the time! If this project were to be installed they would produce half to a third less than that!

2-3 (Air Quality) The air quality deterioration has concurrent hazards which should be carefully studied. What is the effect of such high concentrations of airborne particulates on man? In the subsequent paragraph it is stated that air quality standards are exceeded only during planting and harvesting, yet even during these periods air quality is not properly monitored nor enforced (agricultural air pollution should be carefully monitored for entire annual cycles at already existing developments such as Bell Rapids).

2-8 (Surface Waters) It should also be noted that the Snake River in the study area has a unique native ecology which is now restricted to undammed free-flowing segments. A number of endemic invertebrate and vertebrate species are known to be present, but additional study is needed to determine the extent to which fragile native communities are dependent upon these remnant free flowing reaches. The free flowing segments are of national significance both in terms of recreation potential but also in terms of the heritage of the native ecosystem they encompass. These refugia increase in value as additional areas are sacrificed.

2-30; 31 No actual population data is presented here (with the exceptions of mule deer and antelope, although proper distribution maps aren't presented), and it should be noted that sparse populations are present not only in the ES area but some species are not common throughout their range. Better knowledge of actual population levels would make predictions of impact much more meaningful. Some groups such as the small mammals (rodents) are easily sampled for census purposes.

2-38 Data on population abundance, class structure, locations of preferred habitats and populations outside the ES area are needed for all of the sensitive species. This is likely available for the raptors from the Birds of Prey area research groups, but other species should be examined.

2-41 A good example of a species recognized as sensitive about which very little is known is the western ground snake. It is stated that it likely occurs in the ES area (based on soil types and siftings along the area margin), and it should be censused before habitat disruption of this magnitude is considered. Obviously since no data are presented nothing can be said concerning potential impacts of the project upon the species.

2-41; 42 Another species which should be discussed is the red banded trout, *Salmo* sp., an undescribed species endemic to the Owyhee and Wood River drainages. The status of this species is unknown, but it should be examined at least in the tributaries which would be impacted by this project. It is thought that this species may be approaching extinction. I have attached a Xerox of Simpson and Wallace's (1978) discussion of the species in their recently published book on the Fishes of Idaho.

2-52 Key paleontological references for the Hagerman Fossil Beds and Glenns Ferry Formation are:

Hagerman

Bjork, P.R. 1970. The Carnivora of The Hagerman Local Fauna (late Pliocene) of southwestern Idaho. Amer. Philos. Soc. Trans., new ser., 60 (pt. 7): 1-54.

Gidley, J.W. 1930. A new Pliocene horse from Idaho. Jour. Mammalogy 11 (3): 300-303.

Zakrzewski, R.J. 1969. The rodents from The Hagerman Local Fauna, Upper Pliocene of Idaho. Michigan Univ. Mus. Paleontology Contrib. 32(1): 1-36.

Glenns Ferry Formation

Malde, H.E. and H.A. Powers. 1962. Upper Cenozoic stratigraphy of western Snake River Plain, Idaho. Geol. Soc. America Bull. 73(10): 1197-1220.

Malde, H.E. 1972. Stratigraphy of the Glenns Ferry Formation from Hammett to Hagerman, Idaho. Geological Survey Bulletin 1331-D.

Taylor, D.W. 1966. Summary of North American Blancan nonmarine mollusks. Malacologia 4(1): 1-172.

It would have been useful to cite some of these references, since the area has been studied and is significant. I have attached species lists for the Hagerman Fossil Beds and the Glenns Ferry Formation (Bjork's species listings should be added to Taylor's earlier enumeration). Why not include these in your appendix?

2-53. The Wiley Reach of the Snake River should be added to the Visual Resources section of this document. This area is widely appreciated for its aesthetic values and has considerable impact on drawing tourism away from Highway 80 to Highway 30, benefiting such towns as Hagerman and Buhl. Wiley dominates the entire area as a scenic resource due to the many rapids which are readily seen from the highway (cars are always parked in the viewpoint on the Bliss Grade of Highway 30). This resource should not be ignored.

2-53 Strangely the "Visual Resources" section does not discuss solely aesthetic values. Once again, the most dramatic visual resource, the rapids of the Wiley reach are not included.

2-54 Many aspects of recreational use of the area are not included here, such as those provided by fast-water recreation (rafting, etc.). It should be pointed out that some of the major categories (fast-water recreation opportunities) and sites, such as Wiley and lower Malad, are not mentioned or censused here as they should have been.

Parenthetically, any modern treatment of the area should mention recent extinctions caused by man in the Snake River and its tributaries, i.e. chinook salmon, sockeye salmon, the three-toothed lamprey, and steelhead (the last steelhead and sockeye run I am aware of in the study area was recorded by Paul Cuplin in the tailwaters of C.J. Strike in 1952). At least one snail has become extinct in the Snake because of impoundments.

The Wiley - Dike hearing transcript is not cited, and Simpson and Wallace's new book should be cited.

Simpson, J. and R. Wallace. 1978. Fishes of Idaho. University Press of Idaho, Moscow.

2-55 (Sightseeing) The dominant aesthetic features of the ES area are the free-flowing reaches of the Snake River, in particular the Wiley Reach and Malad River in the Hagerman Valley. Both of these resources are widely appreciated and fit in well with the other local elements described here (Hagerman Fossil Beds, Oregon Trail sites and Kelton Road, etc.). It should also be noted that the Wiley Reach has been designated the fifth ranked site in the state under the U.S. Fish and Wildlife Service's "Unique Ecosystems Program" and that Lower Malad has been nominated as a National Natural Landmark, and the upper area of the river is protected in the Malad Gorge State Park. These features greatly enhance the "sightseeing", recreational opportunity and value of the area.

2-56 (ORV Use) The damage incurred locally by ORV use, such as the area upstream from the Hagerman Fossil Beds, should be discussed. Also, see Sheridan, 1970.

2-58 (Water Sports) Rafting the Wiley reach is becoming so popular that it now is being commercially exploited by a Jerome based company, Snake River Expeditions. They Wiley Reach is also used for fast-water fishing, a point which will be further discussed later.

2-77 (Energy) The energy section of this report is very well done, but I would like to contribute some additional points. Idaho is not married to Idaho Power Company, nor is it the only available power producer in the state. Presently Idahoans are not receiving what many consider their fair share of Bonneville Power, which would probably be cheaper for the consumer, and the upcoming energy considerations in the northwest could impact this issue. Conservation of energy is another point which should be seriously examined and calculated in the graphs. Alternative energy sources such as solar, wind, and geothermal will undoubtedly grow in technology, financial incentive (from both federal and state sources), and cost effectiveness as energy costs rise and new developments in these areas occur. These influences will contribute to overall need relief and some estimate of this should appear in longitudinal projections. Additional generators should be added to many existing facilities with empty stalls (such as Lucky Peak and Pallasades) which would provide added hydro sources. I don't think that the recent Valmy decision (a coal-fired plant co-owned by IPC which gives the company another 250 megawatts/yr.) was calculated into this section.

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2-92 (para. 2) While it is maintained that ORV use will increase with population growth this need not be the case. This could only come about if the BLM lets it. It seems very unlikely that ORVs will have a carte blanche on public lands under BLMs jurisdiction much longer. A useful review of the subject is provided in:

Sheridan, D. 1979. Off-Road Vehicles on Public Land. Council on Environmental Quality.

2-92; 93 Fisheries impacts would probably be much more profound and far-reaching than implied here. If Wiley - Dike were installed there would be no remaining rapids ecology of significance left; sturgeon (requiring free-flowing habitat for reproduction) would be made effectively locally extinct; the trout fishery would suffer as eutrophication increased (see 2-91 "Aquatic"); several snail species and the Shoshone sculpin would be severely threatened with extinction (it is questionable whether the shoshone sculpin could survive in the few streams it now inhabits without the Wiley habitats; the snails would probably go); other mollusks sensitive to eutrophication would be reduced in distribution to the aquifer streams on the north bank from Twin Falls to Bliss; the impacts on aquatic insects would probably be profound as well; the ecology of the Snake/Thousand Springs ecosystem would be boxed into the small feeder streams, but I doubt that they would remain intact long due to aquacultural long-term environmental effects (which are not well known). With a loss of spawning habitat, all gamefish in the river would probably suffer great population reductions, therefore fishing in the Snake River would be very poor (even poorer in the reservoirs, which are notoriously bad even now). The smallmouth bass fishery in the Swan Falls area would be heavily impacted, as would the fishery and all aspects of recreation in the Hell's Canyon area as water levels are dropped to the levels discussed here. Without sufficient instream flows in the lower Snake and Columbia, the survival of steelhead and salmon in the Columbia River drainage is threatened (see Chaney's "A Question of Balance"). Finally, the impact of reducing the river flow would have serious consequences on riparian vegetation - probably causing a gradual change in species composition. "Aquatic emergent vegetation" (cattails and rushes) could be expected to become dominant along reservoir margins; long shallow mudflats would probably be exposed in the older reservoirs; aquatic vascular plants would increase making boating recreation and water skiing less attractive. If reservoir levels become reduced turbidity would increase.

2-94 Vandalism of cultural resources could be prevented by BLM if identified sites were studied and protected.

2-95 I think it is unrealistic to state that power boat use and water skiing would be heavy on the Wiley and Dike reservoirs. Over 70% of the Snake River is already dammed and there are two major reservoirs within 5 miles of Bliss which are not heavily used. Access to Wiley would be bad, i.e. a boat dock at the dam and one at Malad. This is a vastly overblown justification for these dams - in fact the free-flowing Wiley reach supports hundreds of white water raft users (including one company, the Snake River Expeditions from Jerome) and fishermen who prefer free-flowing habitats!

2-88 The downstream significance of this kind of flow reduction should be discussed in terms of actual financial losses to the fisheries industry, as well as hydro and agricultural losses. Input from the Columbia River Fisheries Council should be solicited (as well as the Washington and Oregon Depts of Fish and Game).

2-89 Crisis water flows during dry years seems inevitable. Anticipating return flows on the south bank as clear subsurface flows is very optimistic.

2-91 One could anticipate a drop in DO and the decrease in certain gamefishes in the Snake.

Increased attached vascular plant and algal growth (especially in impoundments) would reduce the attractiveness of the existing impoundments for recreation, and would serve to make the free-flowing stretches more attractive.

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Here is a quote from the Swan Falls impact report discussing recreational needs in Idaho:

Excerpt from: Sigler, W.F., M.L. Wolfe, W.T. Helm and J.M. Neuhold. 1972. The potential impact and assessment of mitigation of Swan Falls and Cuffey Dams on the Snake River Ecosystem.

Recreation

Milliken and Mew (1970) anticipate a very great demand in the near future for reservoir recreation in Idaho. Gebhards (1971) believes differently; he states that over 70% of the Snake River Basin is already flat-water (lakes and reservoir). He continues, "I seriously question that there is a real need for additional flat-water recreation in Idaho, now or in the foreseeable future." Gebhards indicates that although streams provide only 22% of the water surface they support 56% of the fishing pressure. In 1969 an Idaho Fish and Game study between a series of three dams and reservoirs showed 73% of the angling pressure was applied to the flowing stream sections although they comprise only 18% of the available water (Walsh and Reid, 1970). It should be noted that some of the best "stream" fishing was immediately below, and the result of, dams. Gordon (1970) indicates Idaho anglers prefer coldwater species and stream fishing, rather than warmwater species and impoundments as an experience. It should be pointed out that an angler may state he/she prefers a stream fishing experience, but may actually seek out a reservoir if fishing is better there. This tends to reflect on the credibility of this type of survey.

References cited in the above quote:

Milliken, G.J. and H.W. Mew. 1970. Recreational reservoirs. U.S.D.I., Bureau of Reclamation, U.S. Government Printing Office. 18pp.
Gebhards, S.V. 1971. Interagency noncommunication. Presentation, Amer. Fish. So., Salt Lake City, Utah. 6pp.
Walsh, T.L. and W.W. Reid. 1970. Hells Canyon Fisheries Investigation-1969. Idaho Fish and Game Department. 22pp.
Gordon, D. 1970. A survey of angular preferences, behavior and opinions. Idaho Fish and Game Dept. Boise. 100 pp.

2-97 - 2-101 Will the increase in agricultural development mean a proportionate introduction of illegal Mexican laborers? If so, it would mean that state and federal agencies and legislation would be forced to deal with the issue, rather than quietly look the other way as they do now. One would hope that laws could be changed, because if there ever was any kind of crackdown by enforcement agencies it would cause economic havoc to the agricultural industry. This should be treated here in some manner.

3-2 (Air Quality) An aspect of particulate air pollution (caused by the high winds frequently experienced during the spring planting period) which is entirely overlooked is the effect of air-borne silicate particles upon human health. I remember talking with my family doctor several years ago about the effects of airborne silicate particles on humans and he said that many of the local farmers have scarred lung tissue from the dust they breathe while driving tractor. This should be studied because it represents a health hazard (as well as safety hazard which is mentioned in 3-3 para. 2). Are the elderly or those with respiratory problems going to be endangered by the inevitable dust that doubling the present agricultural development will cause? We need to know! The residents of Hagerman know when it's planting time at Bell Rapids because of the terrible dust storms and malingering fine particles in the air for long periods of time. The deposits to be tilled (presumably the Glenns Ferry Formation and Bruneau Formation) are old lake bed deposits, which served as ancient settling ponds for very fine silts. Should any of the farms go broke, an even worse prospect can be anticipated, as the blowing would be much more extensive without plant cover. Lichen communities, which are very slow in developing, reduce open soil loss in natural settings, but once cultivated their return would be very slow over a period of potentially centuries.

I strongly feel that the health aspect should be addressed and also that calculations should be adopted telling us exactly how much particulate matter we could expect to breathe if varying proportions of the farms in this speculative adventure should go broke and not have the money to plant a cover crop before their denouement. Figure 3-1 is familiar to us all (page 3-7). It is very likely that the overall air quality of the ES area would decrease and that it likely could locally be in violation of federal and state standards both during planting and harvesting. This would put enforcement agencies in the position of either making less polluting systems mandatory (which would probably be very expensive) or looking the other way.

3-11 I doubt that Bruneau groundwater could support the projected 80% water necessary for the success of this project. As is pointed out, the USGS already has surfaced the idea of conflicting groundwater uses (where one well sequence dries up another, etc.). I would like to stress the point that this is a different situation from the typical Snake River Plain aquifer sources on the northern bank of the Snake River where present use has increased the groundwater depth.

My point is that I would suspect that groundwater renewal could be much slower on the south side of the river in areas of potential drilling. This could be a very short-lived dependable water source which would then force farmers to attempt to get additional water from the Snake. It would be inviting disaster to depend on projections of 80% groundwater supplying this project when there is nowhere to turn for additional water should this source decline, as most pumped groundwater sources do (and the USGS predicts it will in paragraph 4, page 3-11).

3-11 Once again, I think the magnitude of the Wildlife impacts have been down-played here. The impact of this kind of water flow reduction on the Snake River ecology downstream of the project (downstream from Twin Falls, in fact) would be incredible. The Birds of Prey Area, Hells Canyon, even Salmon and Steelhead runs to the Salmon River would be hard hit. Almost inevitably there would be section 7 violations of the endangered species act as habitat after habitat along the Snake changed directly because of this project. In the Wiley reach alone four potential endangered species situations exist which would experience stress.

The whole story of the Snake River use is one of great habitat damage so that the remaining residuals - a flash in the pan for power production - have greatly increased values, both in terms of biological refugia for a decimated riverine ecology, but also in terms of recreational opportunity of a kind now very limited in southern Idaho (and certainly on the Snake River).

One other fallacy I'd like to challenge is the assumption that reduced water flow in the Snake would mean clearer water (due to the recharge affect of the aquifer tributaries between Twin Falls and Bliss). The impacts of the aquaculture industry would be magnified, as they contribute nitrogen loads (the environmental effects of this industry have never been examined, yet the industry now uses all but a few springs in the system), the effects of which could be accentuated in a low flow condition. Similarly should reservoir levels ever be dropped, vast mudflats could produce very turbid water as waves lap against silts. Should Wiley be installed, this would cause great turbidity changes as clay deposits are broken down and brush decomposition takes place. (The fact that Wiley purportedly would be filled in 1983 - right in the middle of this development sequence - could cause very severe repercussions downstream in the next decade as the decomposition of its inundated vegetation combines with high fertilizer runoff (which would occur whether planned or no); even rainfall runoff into the river would have heavy fertilizer loads from a project of this size...in short, the coupling of low flow and an upstream pollution whose effects are unstudied (aquaculture) with the new dam problems and fertilizer increases could change the complexion of the entire Snake River to its mouth. I would also contest (3-12 "Sedimentation") the downplay of sedimentation as a result of this project. With the disturbance of the topsoil of 111,000 acres, rain or snow runoff would cause enormous contributions of silt to the river via tributaries. This shortens the life time of existing dams and would make the Snake River more turbid. I'm not at all convinced that there would be "clear water" returned as groundwater flow into the Snake River. Remember the King Hill Canal Siphon slippage problem, which was probably caused by underground runoff from Bell Rapids hitting a clay deposit which slid with the siphon foundations attached? Would this imperil residents or lands downhill from the project along the river? Is there any data to support the statements as to the estimated quantity of water returned in this manner?

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3-15 I am not convinced that the pesticide situation should not be looked into by the EPA or some other group. Pesticide contributions to the Snake either through groundwater or runoff should be carefully monitored.

3-16 ("Vegetation") There is a pre-occupation in this document with only considering the "range condition" of the public lands discussed here, although a few endangered species were evaluated. No data is given characterizing any of the vegetation types present. No transects were run, no Shannon-Weiner measures of species diversity, no species lists with voucher specimens, in short, no community ecology was accomplished. No scientist could accept a document without data (aside from sheer acreage estimates) upon which to base predictions of change, precise losses accrued, and mitigations for the particular kinds of losses each habitat allows. The public stands to lose 111,000 + acres of land which is nearly unknown scientifically - it would be gone before we found out what its ecology was. True, a few individuals would benefit from the money made by its development, but most people would not. Most of the land is probably "poor range land", overgrazed with introduced grasses, but I would like to see representative areas accurately and scientifically studied.

3-17 (Attached benthic algae and rooted aquatic plants) Rather than being beneficial I think the point should again be made that more aquatic weed beds make poorer water skiing and boating conditions - two of the most significant reservoir uses, especially since the fishing would be bad from deteriorated water conditions.

3-18 There can be no true mitigation either for loss of free-flowing river (which this project will be used to justify in the case of more main stem Snake dams) or the species associations of native riparian communities. Simulated riparian habitats are composed of different species with different community interrelationships, and saying that reservoir recreational opportunities offsets fast flowing rivers is only giving more opportunity to those who already have the most - the reservoir users.

Impacts on endangered species in the Snake River dependent habitats, must be taken into account. I find it difficult to see how this project could not help but adversely impact endangered species either in the Snake River or in the riparian vegetation. I anticipate the recognition of additional ecologically sensitive situations in the riparian habitats along the Snake in the near future.

3-22 Why isn't data presented here for small mammals (very easily trapped and censused) in each habitat type? In truth, except for looking at broadbrush field guides, no evidence is presented about the actual distributions and abundances of the species involved, thus impacts (not really discussed in an ecological manner) are not known. The raptor discussions are good, and the effects of pesticides upon reduced reproductive success should be noted as the pesticide load will be much higher.

3-28 (Sensitive species) Data derived from new and current field studies are needed for all of the "sensitive" species. Abundance and locations for populations are essential to understanding the impacts of range reductions. Without this kind of information and a better knowledge of why a species is sensitive, it is dangerous to downplay potential impacts. For example, it is suggested that spotted bats might benefit from additional agricultural development (more roosting sites in buildings), yet this insectivore would be vulnerable to high pesticide uptake in its prey. Solitary or wide-ranging species would certainly be heavily impacted in the (raptors, bobcats, etc.). The problem with this section of the report is that population levels within the ES area, exact locations and ranges of the populations, and suitable habitats and population levels outside the impacted area are not presented. As far as I can determine no effort was extended to measure these parameters in the field. It is likely that many species would be excluded from the area, but too little is known about the ecology and other populations in Idaho to understand the significance of this loss of habitat for the sensitive species which have been identified.

3-36 Another feature not discussed is that fish ladders, for example at Lower Salmon and Swan Falls Dams, would remain dry. Irving and Cuplin (1956) demonstrated that trout do move between dams, but with reduced flow they could only go through the turbines.

3-38 (Accidental Mortalities) It seems inevitable that one way or another pesticides and fertilizers are bound to find their way into the Snake River in increasing quantities. Since pesticides concentrate as they go up the food chain, how long will it be before we can't eat trout, small mouth bass, channel cat, crappie or other game fish in the Snake? Where will the mitigation be for this?

3-42 Before any land is allocated a complete walking survey using acceptable methodology should be undertaken by professional archeologists. The value of sites cannot really be known prior to excavation - and I don't mean backhoe digs. It would have been appropriate to have had the survey complete for this ES, however, it is a mammoth task. I would even suggest BLM personnel be on hand during clearing of land for cultivation - it would not be a novel event for a bulldozer to just cover over paleontological or pre-historic sites once they are found to avoid federal hassles and development slowdowns. This area houses over 300 known fossil sites and is situated on a rich fossil bearing deposit (the Glenns Ferry Formation) with many still unresolved questions, as Malde, 1972 states:

"In summary, paleontologists now agree that the lower part of the Glenns Ferry Formation is late Pliocene, and this conclusion is supported by a potassium-argon date of about 3.5 m.y. To resolve conflicting ideas on the age of the upper part, whether late Pliocene or early Pleistocene, detailed studies are needed of the stratigraphy and paleontology of the Glenns Ferry Formation westward from the area of these sections to the Grand View area. Such studies might show that the Glenns Ferry Formation spans the Pliocene-Pleistocene boundary."

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Malde, H.E. 1972. Stratigraphy of the Glens Ferry Formation from Hammett to Hagerman, Idaho. Geological Survey Bulletin 1331-D.

Malde, H.E. and Powers, H.A. 1962. Upper Cenozoic stratigraphy of western Snake River Plain, Idaho. Geol. Soc. America Bull. 73(10) 1197-1220.

Taylor, D.W. 1966. Summary of North America Blancan nonmarine mollusks. Malacologia 4(1): 1-172.

Malde, H.E. 1968. The catastrophic late Pleistocene Bonneville Flood in the Snake River Plain, Idaho. U.S. Geol. Survey Prof. Paper 596.

Dr. H.E. Malde (USGS) and Dr. D.W. Taylor (Tiburon Center for Environmental Studies, San Francisco State University) should be contacted in regard to specific localities.

3-42 By far the most attractive visual resource in the area is the Wiley Reach of the Snake River, which will be increasingly used in its natural undammed state but would be just another deserted impoundment if dammed. Impoundment users have 70%+ of the Snake to enjoy - including Upper Salmon, Lower Salmon, Bliss Dam, C.J. Strike, and Swan Falls impoundments locally.

3-46 Should this project be implemented, very heavy use of the undammed free-flowing stretches would be anticipated as downstream eutrophication in the impoundments became marked. The negative effects of aquatic growth would make the free-flowing areas even more attractive. ORV use should be curtailed and confined to a restricted area - preferably to sites like the one upstream from the Hagerman Fossil Beds where ORV use has already gutted considerable habitat.

3-64 Does this include sewage treatment facility costs? What would be the annual county maintenance costs for the roads once constructed? 37

3-66 (Social Values) Once again I see no mention of the thousands and thousands of illegal aliens (Mexicans) who would be imported to move sprinkler pipe, work in potato storage facilities, etc. 38

3-66 (Crop Prices) This is an amazing section! Within five years prices would be driven so low that not only these new indebted developers but all other potato producers in Idaho would probably be forced to go out of business! With escalating costs this kind of statistic makes the development look like suicidal folly for the farmer in Idaho.

Year	Author	Taxa Recorded
1970	P.R. Bjork	<i>Canis lepophagus</i> <i>Borophagus</i> sp. <i>Ursus abstrusus</i> <i>Mustela rexroadensis</i> <i>Ferinestrix vorax</i> <i>Trigonictis idahoensis</i> <i>Trigonictis cooki</i> <i>Sminthosinis bowleri</i> <i>Buinectis brevitrans</i> <i>Taxidea</i> sp. <i>Satherium piscinaria</i> <i>Felis lacustris</i> <i>Machairodus? hesperus</i> <i>Ischyrosmilus</i> sp.

Table 1 from Bjork, 1970 with his records summarized above. (A couple of previously recorded species are verified and several are synonyms in the above listing).

Bjork, P.R. 1970. The Carnivora of the Hagerman local fauna (late Pliocene) of southwestern Idaho. Am. Philos. Soc. Trans., new ser., v. 60, pt. 7, 54 p.

Species list of the Hagerman local fauna from Bjork, 1970.

VOL. 60, PT. 7, 1970

STRUCTURAL GEOLOGY

TABLE 1

CHRONOLOGY OF TAXONOMIC CONTRIBUTIONS TO THE HAGERMAN LOCAL FAUNA

Year	Author	Taxa recorded	Year	Author	Taxa recorded
1930	J. W. Gidley	<i>Plesippus shoshonensis</i> *	1965	F. R. Gehlbach	<i>Pseudemys idahoensis</i> Gilmore
1933	C. L. Gazin	<i>Blarina gideleyi</i> *	1966	D. W. Taylor	Faunal list with many unpublished records
	C. L. Gazin	<i>Felis lacustris</i> *, <i>Machairodus?</i> <i>herpessus</i> *	1967	J. A. Feduccia	<i>Ciconia multa</i> Miller, <i>Grus americana</i> (Linnaeus)
	C. W. Gilmore	<i>Pseudemys idahoensis</i> *		N. L. Ford and D. G. Murray	<i>Speotyto megalopeus</i> Ford, <i>Asio brevipes</i> *
	A. Wetmore	<i>Colymbus</i> sp., <i>Pelecanus halisae</i> *, <i>Phalacrocorax idahoensis</i> (Marsh), <i>P. auritus</i> (Lesson), <i>Phalacrocorax</i> sp., <i>Chen presna</i> *, <i>Gullinula choropus</i> (Linnaeus), <i>Cygnus</i> sp., <i>Querquedula</i> sp.	1967	C. W. Hibbard and R. J. Zakrzewski	<i>Ophiomys taylori</i> (Hibbard)
1934	C. L. Gazin	<i>Lutra idahoensis</i> *, <i>L. cookii</i> *, <i>Lutra (Salicetum) piscinaria</i> Leidy		R. R. Miller and G. R. Smith	<i>Idalorus vesperinus</i> *, <i>Archophiles taylori</i> *
	C. L. Gazin	<i>Hypobagrus ne. velus</i> (Kellogg), <i>Hypobagrus limnetis</i> *, <i>Allopius cogan</i> *, <i>Thomomys gideleyi</i> *, <i>Ondatra idahoensis minor</i> *, <i>Miomomys (Cosomys) primus</i> (Wilson)		B. G. Murray	<i>Podilymbus baryosteus</i> *, <i>Podiceps discors</i> *, <i>Aechmophorus elasson</i> *, <i>Podilymbus majorculus</i> *
	C. L. Gazin	<i>Megalonyx leptonyx</i> (Marsh), <i>Crotomys prenticei</i> *		R. J. Zakrzewski	<i>Trigonictis idahoensis</i> (Gazin), <i>Trigonictis cookii</i> (Gazin)
	R. A. Stirton	<i>Castor cf. C. californicus</i> Kellogg	1968	J. A. Holman	<i>Natrix hibbardi</i> *, <i>Thamnophis</i> sp., <i>Coluber</i> sp., <i>Elaphe piscinaria</i> *, <i>Elaphe sulpina</i> Baird and Girard
	C. L. Gazin	<i>Plesippus shoshonensis</i> Gidley and a faunal list		J. A. Feduccia	<i>Rallus prenticei</i> (Wetmore), <i>Rallus lacustris</i> (Brodkorb), <i>Rallus elegans-longirostris</i> group, <i>Colinus vociferans</i> *, <i>Gallinula</i> sp.
1937	C. L. Gazin	<i>Cynomys?</i> <i>idahoensis</i> (Gazin), <i>Cynomys?</i> <i>cooki</i> (Gazin)	1969	K. E. Campbell	Leporidae postcranial skeletons
1938	C. L. Gazin	<i>Platygonyx pearcei</i> *		C. W. Hibbard	<i>Praillepus vagus</i> (Gazin), <i>Hypolagus aff. H. vetus</i> (Kellogg), <i>Hypolagus limnetis</i> Gazin
1938	P. Brodkorb	<i>Porzana lacustris</i> *, <i>Bucephala</i> sp., <i>Phalacrocorax macror</i> *, <i>Cygnus hibbardi</i> *, <i>Anas platyrhynchos</i> Linnaeus		G. R. Zug	<i>Chrysemys idahoensis</i> (Gilmore), <i>Clemmys omyheensis</i> Brattstrom and Sturn
	C. W. Hibbard	<i>Mustela gazini</i> *		R. J. Zakrzewski	<i>Panamaemeta barboursi</i> Hibbard and Schulte, <i>Citellus cf. C. howelli</i> Hibbard, <i>Citellus</i> sp. 3 different sizes, <i>Thomomys gideleyi</i> Wilson, <i>Flageoemyx parvus</i> *, <i>Perognathus magnum</i> *, <i>Perognathus maldesi</i> *, <i>Protopodomyx idahoensis</i> Hibbard, <i>Castor cf. C. californicus</i> Kellogg, <i>Dipodops intermedius</i> *, <i>Peromyscus hagermanensis</i> Hibbard, <i>Baiomys aquilonius</i> *, <i>Baiomys</i> sp., <i>Neotoma cf. N. quadruplicatus</i> Hibbard, <i>Ophiomys taylori</i> (Hibbard) <i>Cosomys primus</i> Wilson, <i>Flisopotamys minor</i> (Wilson)
1959	C. W. Hibbard	<i>Nebraskomys? taylori</i> *, <i>Miomomys (Cosomys) primus</i> (Wilson), <i>Flisopotamys minor</i> (Wilson)			
1961	T. Uyeno	<i>Diatichis parvidens</i> Cope, <i>Mylopharodon hagermanensis</i> *, <i>Sigmapharyngodon idahoensis</i> *, <i>Psychocichlus cf. P. oregonensis</i> (Richardson)			
1962	C. W. Hibbard	<i>Peromyscus hagermanensis</i> *			
1964	P. Brodkorb	<i>Olor hibbardi</i> (Brodkorb), <i>Anser presna</i> (Wetmore), <i>Nettion bunkeri</i> Wetmore, <i>Olor columbianus</i> (Ord), <i>Bucephala fassilli</i> ? Howard			
	Mary Fine	<i>Canis cf. C. latrans</i> Say			

* = type description.

SPECIES LIST FOR THE GLENN'S FERRY FORMATION (add the list for the Hagerman local fauna for additional species). From Taylor, 1966 (see bottom of page for reference)

BLANCAN NONMARINE MOLLUSKS

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An asterisk marks species that are so widespread that they do not show a particular relationship between the faunas of the two areas. The number of common species, or of pairs of related species, is due to both approximate contemporaneity and similar facies, the relative effects of which cannot be distinguished now. The biogeographic relations of these 2 areas have been discussed previously (p 17-27).

Blancan Fossils from Glens Ferry Formation

The following list includes all of the vertebrates, and the previously described species of mollusks, known from the stratigraphically lower (Blancan) part of the Glens Ferry Formation. The fossils excluded are those from the volumetrically small middle Pleistocene part of the formation, along the Snake River from Froman Ferry to Jackass Butte. The list of mammals includes the unpublished results of collecting by C. W. Hibbard and parties from the University of Michigan Museum of Paleontology. Records or descriptions of fossils from this part of the Glens Ferry Formation are included in the following papers: Boss (1932), Brodkorb (1958, 1963, 1964a), Conrad (1871), Cope (1870a, b, 1871, 1883a, b), Dall (1924a, b), Dall and Harris (1892), Fine (1964), Gabb (1866-1869), Gazin (1933a, b, 1934a, b, 1935a, b, c, 1936, 1937a, 1938), Gidley (1930a, b, 1931), Gilmore (1933, 1938), Hall (1845), Henderson and Rodeck (1934), Herrington (1962), Herrington and Taylor (1958), Hibbard (1958a, b, 1959, 1962), Hibbard and Taylor (1960), Keith and Weber (1964), Kirkham (1931), Leidy (1870a, b, 1871, 1873), Lindgren (1900), Lindgren and Drake (1904), Lindgren and Knowlton (1898), Littleton and Crosthwaite (1958), Malde and Powers (1962), Meek (1870, 1877), R. R. Miller (1948), L. Miller (1944), R. R. Miller (1958, 1965), Newberry (1870a, b, c, 1871a, b), Russell (1902), Stearns et al. (1939), Stirton (1935), Taylor (1958, 1960a), Uyeno (1961),

Uyeno and Miller (1963), Weber and La Rocque (1964), Wetmore (1933), White (1882), Wilson (1933, 1937), Yen (1944), Youngquist and Kilsgaard (1951). A diverse pollen flora is under study by E. B. Leopold, who mentioned briefly (Leopold in Weber, 1965) some climatic inferences from this and other late Cenozoic floras from Idaho.

- Class Pelecypoda
- Order Schizodontia
- Margaritiferidae
- Gonidea malheurensis* (Henderson and Rodeck)
- Unionidae
- Anodontia
- Order Heterodontia
- Sphaeriidae
- Sphaerium idahoense* Meek
- Sphaerium hellemanense* Arnold
- Sphaerium striatum* (Lamarck)
- Pisidium compressum* Prime
- Pisidium punctatum* Sterki
- Pisidium supinum* Schmidt
- Pisidium woodringi* Yen
- Class Gastropoda
- Order Archaeogastropoda
- Payettidae
- Payettia dallii* (White)
- Order Mesogastropoda
- Valvatidae
- Valvata humeyalis* Say
- "Aphanotylus" whitei* Dall
- Planorbuloidea
- Planorbis campbelli* (Dall)
- Planorbis idahoensis* Yen
- Orygoceratidae
- Orygoceras arcuatum* Dall
- Orygoceras crenulatum* Dall
- Orygoceras idahoense* Dall
- Orygoceras tubi* Dall
- Hydrobiidae
- "Amnicola" bithynoides* Yen
- Fonticella idahoensis* (Pilsbry)
- Lithoglyphus occidentalis* (Hall)
- Lithoglyphus superbus* (Yen)
- Lithoglyphus weaveri* (Yen)
- "Pyrgulopsis" carinata* Yen
- Pyrgulopsis*
- Stearns et al. (1939), Stirton (1935), Taylor (1958, 1960a), Uyeno (1961),

Taylor, D.W. 1966. Summary of North American Blancan nonmarine mollusks. Malacologia 4(1): 1-172.

Shoshone Sculpin



SHOSHONE SCULPIN
Cottus greeni



Body is cotton in shape; lateral line incomplete; prickles present, mainly behind the axils and at the base of the dorsal fin. Head large, broad, and oval in shape. Dorsal fin with 6 spines and 18 or 19 rays; anal fin with 12 or 13 rays. Color brownish to brownish-gray; back and sides covered with several blackish bars.

The type locality for the Shoshone sculpin is the Thousand Springs, Snake River near mouth of Salmon Falls Creek in Idaho. Its range is much restricted and collections so far have confined it to the Snake River and tributary streams in Hagerman Valley.

Little is known of its life history, but it is assumed to be similar to that of other sculpins.

The Shoshone sculpin, because of its restricted distribution, may be a species with a precarious future. It originally was considered a threatened species but will soon be placed in the "special concern" category. The immediate threat to the Shoshone sculpin appears to be loss of habitat due to water diversion for irrigation and commercial trout hatcheries. Hopefully, the appropriate management agencies will become aware of the potential problem and provide adequate protection for this species endemic to Idaho.

Owyhee River drainage; Wood River drainage and other streams tributary to the Snake River from Heils Canyon to Shoshone Falls. Rare, possibly now extinct in Idaho.

Salvelinus alpinus (Linnaeus). Arctic char. (I) Included provisionally. Reported stocked in several lakes in Sawtooth Mountains. *fontinalis* (Mitchell). Brook trout. (I) Widely distributed. *malma* (Walbaum). Dolly Varden. (N) Snake River drainage below Shoshone Falls; Lost Rivers; Spokane River drainage; Kootenai River drainage; namaycush (Walbaum). Lake Trout. (I) Bear Lake; Priest Lake; Payette Lake; Palisades Reservoir. Common. Pend Oreille Lake. Rare. *Thymallus arcticus* (Pallas). Arctic grayling. (I) Planned in several mountain lakes throughout the state. Common.

FAMILY OSMERIDAE - smelts
Osmerus mordax (Mitchell). Rainbow smelt. (I) Planted in 13 lakes in Sawtooth Mountains. No evidence of survival and probably extinct in Idaho. Included provisionally.

FAMILY ESOCIDAE - pikes and pickereles
Esox lucius Linnaeus. Northern pike. (I) Reported stocked in the Boise River in 1892. Recently taken from the Clark Fork River and lakes of the Coeur d'Alene River drainage; one specimen removed from a farm pond near Orofino (Clearwater drainage). Rare.

FAMILY CYPRINIDAE - minnows and carps
Acrocheilus alutaceus Agassiz and Pickering. Chisel-mouth. (N) Snake River system below Shoshone Falls. Common.
Carassius auratus (Linnaeus). Goldfish. (I) Isolated ponds throughout the State. Rare.
Couesius plumbeus (Agassiz). Lake chub. (N) Kootenai River system. Common.
Cyprinus carpio Linnaeus. Carp. (I)

Widely distributed

Gila atraria (Girard). Utah chub. (N) Snake River system upstream from Shoshone Falls; Bear River; Wood River. Abundant.
bicolor (Girard). Tui chub. (I) Lower Boise River. Rare.
Jordan and Gilbert). Leathenside chub. (N) South Fork Snake River, upper; Bear River, upper. Rare.
Wood River. Common.
Mylocheilus caurinus (Richardson). Peamouth. (N) Snake River system below Shoshone Falls; Coeur d'Alene River; Pend Oreille River; Kootenai River. Abundant.
Pimephales promelas Rafinesque. Fathead minnow. (I) Planted in ponds on Perrine Trout Farm, Twin Falls, Quayle Lake, Jefferson County. Common.
Ptychocheilus oregonensis (Richardson). Northern squawfish. (N) Snake River system below Shoshone Falls; Pend Oreille River system; Spokane River system; Kootenai River system. Abundant.
Rhinichthys cataractae (Valenciennes). Longnose dace. (N) Widely distributed. Common.
falcatu (Flegmann and Egenmann). Leopard dace. (N) Snake River from Brownlee Reservoir to Shoshone Falls. Common.
oculus (Girard). Speckled dace. (N) Widely distributed. Common.
Richardsonius balteatus (Richardson). Redside shiner. (N) Snake River system; Spokane River system; Pend Oreille River system; Kootenai River; Bear River and independent drainages. Abundant.
Trisca trisca (Linnaeus). Tenth. (I) Pend Oreille River system; Coeur d'Alene River system; St. Joe River system, lower. Abundant.

FAMILY CATOSTOMIDAE - suckers

Catostomus ardens Jordan and Gilbert. Utah sucker. (N) Snake River above Shoshone Falls; Bear River; independent drainages. Abundant.
catostomus (Forster). Longnose sucker. (N)

Letter 20 Responses

1. Idaho Power Company (IPC) is currently working on three projects for completion in 1979 and 1980 which will serve forecasted load increases for the near future. These are added generating units at Brownlee Dam and Jim Bridger and Boardman coal-fired plants. Idaho Power Company was recently authorized to participate with Sierra Pacific Power Company in construction of a 500 MW coal fired plant at North Valley, Nevada. This facility will be in full operation by 1984. In addition, IPC is making extensive investigations into constructing about a dozen generating facilities on the Snake and Payette Rivers, Cascade and Lucky Peak Reservoirs and on some existing irrigation canals. Idaho Power is also considering the possibility of constructing a coal-fired plant in southern Idaho in the late 1980's or early 90's.

There is no clear direct cause and effect relationship between the agricultural development discussed in this ES and these existing and future IPC facilities. The construction of certain power plants would not be "triggered" by BLM's decision to release land in the ES area for agriculture expansion. However, a portion of the power output from some of these power projects will be constructed and some won't. It is not feasible to address environmental impacts associated with these different proposals at this time. Environmental statements will be completed when decisions are made to construct specific facilities. See responses to comments 5 and also 7.

It should be pointed out that the FES does analyze some general impacts associated with a thermal coal plant constructed in southern Idaho (see Self-Sufficiency Scenario in the Energy section, Chapter 3).

- 2. The air quality discussion in Chapter 3 has been strengthened to address your concern.
- 3. See discussion of this trout species in Chapter 3 - Endangered Species.
- 4. Chapter 3, Water Quality has been enlarged to address this.
- 5. Idaho Power Company officials advise that Dike and Wiley dams comprise a small component of future power generation facilities in their overall master plan which includes numerous different projects currently under consideration. Because of the relatively small amount of generating capability of Wiley and Dike dams, the construction of these facilities will not be justified by new power demands created by increased agricultural development in the ES study area. Wiley and Dike could provide a small increment of power for any number of electrical demand needs other than new high-lift pumping. There is no direct link between the decision to allow further DIA and CA farm development and the decision to construct these dams, and therefore, environmental impacts associated with Wiley and Dike are not addressed in this ES.

Construction of a coal fired plant to provide electricity for the proposed action is considered more likely. A discussion of typical

impacts associated with such a plant can be found in the Air Quality & Water Supply, and Energy sections of Chapter 3.

6. Early in "scoping" this document, it was determined that the BLM would use the concept of a programmatic ES. There are over 500 DIA and 16 CA project applications in the ES study area. Map 1-3 illustrates the public land under application and also the land where multiple over filings are found i.e., conflicting applications for the same land. It would be impossible at this point to try and decide what projects or who would have first development rights to these lands. The purpose of this ES therefore, is to identify the major regional impacts associated with high-lift agricultural development (energy, water, etc.) regardless of who would have the opportunity. The ES will lead to a decision as to how much and where land in the study area should be allowed to be developed. Site specific environmental analysis of particular projects will then be made after that decision is made.

- 7. See Response 5.
- 8. Chapter 1 text discussions of Wiley and Dike Dams have been expanded.
- 9. See Response 2.

10,11,12. In concurrence with your overall response to the wildlife section in the ES we agree that further information dealing with; population densities and distributions, age class structure, locations of preferred habitats, extent of home ranges and specific habitat needs, would be beneficial in assessing impacts to wildlife (particularly non-game and sensitive species). On the other hand the quality and completeness of our work is largely limited by severe time constraints and minimal monetary funding. Under the time frame we had to work under, we obtained the best and most information which is currently available for the ES area. Due to limited time for field work we collected wildlife information from local sources which represented; the general public, conservation groups, and pertinent state and federal agencies. In addition, we also drew information from numerous publications dealing with specific wildlife species and used applicable data obtained by Birds of Prey Natural Area research.

It should be noted per wildlife mitigation measures identified in Chapter 4 that site specific field surveys for sensitive species will be conducted before any land releases for farm development takes place.

After compilation of all available information and numerous reviews of our impact analysis we feel it to be a good picture of what can be expected should the proposed action be implemented. We are aware that in some instances our impact analysis may seem oversimplified to a member of the scientific community.

As professional biologists we also feel hindered by this required oversimplification at times. One must remember that the purpose of the ES process is not to serve the scientific community but rather to inform the general public and the decision makers what the basic impacts of the proposed action would be upon the resource in question.

13. See Response 3.

14. The references have been added in accordance with the comment.

15. The Wiley reach is included within the Snake River corridor which is classified as a Visual Resource Management Class II Area (see Map 2-10).

16. During the early scoping phases of this ES, aesthetic values and impacts were not judged to be significant enough to include in the document.

17. Float boating is mentioned within the water sports portion of this section.

18. No changes were deemed necessary since sightseeing use along the Snake River is discussed in this section. The Malad River is outside of the ES study area.

19. The FES text has been revised to reflect your comment.

20. The Water Sports section of Chapter 2 has been revised to reflect your comment.

21. A discussion of alternatives to Idaho Power Company as a source of electricity is contained in the response to Letter 7, Response 1.

Bonneville Power would probably be cheaper than IPC for consumers.

Conservation and alternative energy sources were not explicitly included in various demand forecasts to include an assumed response to

higher electricity prices.

Alternative energy sources for pumping were discussed in response to Letter 7, Comment 1 as well. Conservation has been factored into the estimation of proposed action electricity consumption by such assumptions as very high pump and motor efficiency, and maintenance of peak efficiency throughout the pump season. To estimate a significant level conservation beyond that already included would require assumptions of radical changes in irrigation practices and technology, for example, trickle or drip irrigation systems rather than sprinklers.

Conservation and/or use of alternative energy sources by electricity consumers other than new irrigators could significantly affect future electricity demand and as a result the availability and cost of electricity for the proposed action. However, within the confines of this ES an analysis and forecast of the timing, magnitude and cost of the level of conservation and alternative energy use necessary to make significant summer electricity supply available from existing resources is not possible.

The proposed action July load is 208 average MW under "average" case weather conditions. Forecasts of electricity conservation and replacement of electricity use by alternative energy sources at a level which would allow any significant portion of this load to be met from existing electricity supplies would require assumptions of utility company policies, State policies and a commitment to significant capital investments. Such policies and commitments of investment have certainly been suggested, however, these policies do not now exist. As a result there is no basis at this time for making assumptions about energy conservation and alternative energy use.

For the most part, existing hydrofacilities to which additional capacity could readily be added are Federal facilities. Additional electricity from these facilities would be marketed by BPA. Currently there is no public utility which BPA will supply with firm power that could serve proposed action loads. (See also responses to Commenter 80-Twin Falls Hearing, Comment #'s 1, 2 & 3).

IPC's application for the Valmy, Nevada plant was before the IPUC while the ES draft was being written. IPC's participation in a plant in Western Oregon were the basis for "Case 2" of the electricity supply and cost analysis in Chapter 3. This is discussed further in response to Commenter 66 - Boise Hearing - Comment #4.

22. Accepted in part. Chapter 2, Existing Environment of the ES notes that peaking and flow problems exist in the lower Snake River. Chapter 2, Future Environment indicates that irrigation withdrawals in the Snake and Columbia rivers would eventually significantly damage downriver fisheries. The proposed action is a part of this, but insignificant in itself. During the downstream migration of anadromous salmonids, in April-May, the mean flow decrease attributable to the proposed action would be 0.45 percent for April and 0.74 percent for May, according to Idaho Department of Water Resources modelling. Chapter 3 of the FES has

been revised to include this discussion. Chapter 5, Fisheries, indicates that as part of cumulative effects of Columbia Basin water withdrawals, reduced flows as a result of the proposed action would slightly affect anadromous fish. There will be no measurable water quality changes in the area below Hells Canyon Dam as a result of the proposed action.

23. Part a - accepted. Figure 3-5, Wetted Perimeter addresses this problem, indicating very significant losses of wetted perimeter in 1977 flow conditions (a drought year). Chapter 3, Fisheries, address the problem to the extent that available information permits.

Part b - rejected. Consultation with C. Dale Ralston, a specialist in the Department of Geology, University of Idaho, contributed to the opinions expressed in Chapter 2, Future Environment, Water Quality. The basic assumption of sprinkler irrigation and geology of the area makes subsurface flow the likely outcome. These assumptions make the ES action results quite different from results of gravity irrigation presently underway in the area of Twin Falls.

24. Oxygen should remain near present levels in all ES areas without the proposed action, as point sources of pollution continue to come under improved effluent loading requirements. Future irrigation would be by sprinkler, so that BOD does not enter the river with runoff, except for accidents of unpredictable timing and extent. No change in game fish stocks is expected as a direct result of oxygen changes.

25. Accepted in part. This ES chapter addresses the expected future environment without the proposed action. Effects on sturgeon are treated in the Fisheries section. Effects on trout are conjectural; it is not anticipated that trout habitat now in existence would be damaged by eutrophication as discussed in the Vegetation-Aquatic section. Much of that habitat would be lost to Dike and Wiley reservoirs. The Shoshone sculpin is primarily a spring dweller in the ES area, and the springs in which it lives will remain. Aquifer streams on the north bank of the Snake River will probably be affected as noted in Water Quality (groundwater). It is correct to state that long-term effects of aquaculture loadings of nutrients are not well-known. See response to your Comment 23. The loss of spawning habitat mentioned in the comment is treated in the Fisheries section. The extent of loss of gamefish populations is treated under other Fishes, except for the revision at the end of this section in the FES.

Effects on the future environment of the lower Snake River without the proposed action are discussed under Fisheries. Effects on plants are mentioned under Vegetation. Long, shallow mudflats appear where reservoirs fluctuate markedly. Reservoirs in the ES area are operated for small daily fluctuations and run-of-the-river flows. There is no evidence that reservoir levels would decrease, as they are hydropower facilities.

26. The Social-Economic Conditions section of Chapter 3 in the FES has been revised to include a discussion on the illegal laborers problems.

27. See Response 2.

28. Rejected. Phosphorous is assumed to be the principal nutrient which will limit growth of algae and vascular plants for most of the summer and fall (IDWH 1978, EPA 1974b and EPA 1975), but in any case, the analysis Chapter 3, Water Quality assumed continued nutrient loadings into flows which would then be partially pumped onto irrigated areas. Thus nutrient loading should remain relatively the same in water which remains in the river. Total load of all hatchery outfalls in terms of suspended solids is about 14.7 mg/liter (adapted from Klontz and King 1974). Total dissolved solids at King Hill averaged about 300 mg/liter in summer (USGS 1971). Hatchery loading in total is thus about 4.6 percent of the TDS load. IDWH (1978) refers to hatcheries along the Snake River as minor contributors to Snake River nutrient concentrations.

29. Very little water erosion takes place on the large farm projects presently found in the ES area. This is primarily due to efficient sprinkler application of water coupled with the high cost of pumping which effectively limits excessive water application on the crops grown on high-lift projects. There may be occasional cloud bursts, and spring thaw conditions that could generate sediments off fallow fields. However, as mentioned in Chapter 1, the BLM intends to require catchment basins in drainages on and/or around the perimeter of farm project areas to trap excessive runoff and sediments. This will effectively limit sediments going into the Snake River from new agricultural development areas.

30. IDWR provided the original assumption of 15 percent return-water from the proposed action. Geology of the area indicates it will return via tributaries and perched-flow systems; but in any case after percolation. See Response 18 also.

31. From a purely scientific perspective, this ES document may lack the level of data inventory (vegetation for instance) that might be collected for a thesis project or some other academic study. Early on, scoping was done on available resource data and it was determined that a new vegetative inventory was not a critical need for the purposes of this ES, except for threatened and endangered species. A comprehensive threatened and endangered plant inventory was conducted in the spring and summer of 1978 (see Vegetation section, Chapter 2). Other plant information depicted in this ES was derived from aerial photos, existing range survey maps, and BLM Unit Resource Analysis information. The various plant species were categorized in five vegetative types shown on Map 2-5. This represents the best information that was available within the time and budget constraints of this ES.

32,33,34 See Response 10.

35. In the worst-case situation at Lower Salmon Falls, the flow would be reduced from 6293 CFS in July to 5745 CFS. Irving and Cuplin did note that trout moved over the dams in the ES area. On p. 148 they state "Observations of the use made of fishways over dams in the study area, plus analyses of creel census and fishway collection data indicate the only beneficial uses made are by a few steelhead that use the fishway over Swan Falls Dam and a substantial run of whitefish that use the fishway over Lower Salmon Falls Dam. The use of fishways by species of non-game fish is rather extensive and can only be considered detrimental to the fishery of the area." No steelhead now pass Hells Canyon Dam. The authors also mention that a few trout may pass over the Lower Salmon Falls fishway. They then state "It is believed that the majority of tagged trout that moved downstream past Lower Salmon Falls dam did so with the water that flow through the turbines. Observations on the movement of concentrations of hatchery trout from the area just above the upper plant at Upper Salmon Falls to the area just below this plant tend to substantiate this belief."

36. The section on cultural resources in the Proposed Action, Chapter 1, refers the reader to Appendix 14, Cultural Resource Survey Standard Procedures which reads in part: "Prior to allowance of farming or any related construction activities, all land under consideration for agricultural development would undergo intensive cultural resource inventory." The field methods for conducting such an inventory are found in BLM Manual 8111-Cultural Resource Inventory and Evaluation (Upland), in the section dealing with Class III - Intensive Field Inventory. The methodology specifies a walking survey with appropriate spacing of transects.

A discussion of the value of sites in the ES area was omitted in the interest of saving space; however, you are correct in your statement regarding the importance of excavation. Backhoe digging is not an acceptable archaeological technique in the Boise District Cultural Resource Management program.

Most everyone agrees that surveying the ES area prior to writing the ES is preferable; your realization of the enormity of the task is appreciated. It should be emphasized that farm units will be intensively inventoried when they are identified and in all cases, prior to allowance. (Chapter 1, Authorizing Actions). The National Advisory Council on Historic Preservation recognized that inventory may not be possible over large areas prior to writing an ES and accepts as proof of compliance with Section 106 of the National Historic Preservation Act (page A-8) "...evidence of an effort to ensure the identification of properties eligible for inclusion in the National Register, including evidence of contact with the State Historic Preservation Officer..."

Your suggestion of requiring the presence of BLM personnel during

land clearing is well founded but not possible to implement under the proposed action. Once farm units are allowed the BLM has no authority to stop operation and require further mitigation. Only Alternative 4 - Development under FLPMA Lease would permit BLM involvement after farm development begins. (Management Goal #2).

37. The table does include sewage treatment costs. Farm roads would be maintained by the local highway district or county governments and would be bladed once or twice a year. Estimates of maintenance costs range from \$100 to \$200 per mile per year. The maintenance costs resulting from the proposed action would range from \$30,000 to \$60,000 annually. It is anticipated that this additional cost would not significantly impact the highway districts or county governments.

38. The FES includes a discussion on illegal aliens.

District Manager
Bureau of Land Management

June 18, 1979

My wife and I are vitally interested in securing our Desert Entry land, filed on, in February 1973. Since that time we have made numerous enquiries and trips to the land, and are quite satisfied as to its and our ability to return a profit, because of the sandy loam soil and the abundance of sagebrush and native grasses. Water is also within economic pumping lift at this location, with the advancements in solar and wind energy utility power is our last consideration.

I am an agricultural graduate of Fresno State University having taken agriculture in high school and a past member of the Future Farmers of America. Since graduation I have been actively involved in agriculture sprinkler irrigation sales in California, Idaho, Oregon and Washington. We have the experience and education to become successful family farmers with no desire to sell this land, but to keep it in our family and build acreage through our future generations. It is our intention to live on this land although it will not be our only source of income, so those marginal years required to build a successful farming operation will not place our overall income below the poverty level.

I noted on chart 1B a portion of our entry number 6507 and 6508 is within the proposed area. Will the entire entry be allowed, as anything less than 640 acres would be difficult to spread growing costs over. Also the land should be contiguous for our farming program to be efficient.

cont'd page 2

21

A check should be made on all entries to ascertain whether or not those who filed are still in a position to prove on their entries. Many people during this long wait, have moved from Idaho. The BLM has cracked down on people gaining entries to be sold at a future date to corporations, many people would not be able to gain necessary borrowing power, and a lot of people lack agriculture knowledge. As a result not every entry in the proposed development would be proved on.

A greater amount of time to prove would lessen the amount of acreage placed into production thus lessening impact of increasing farm commodities on the market place.

More and more crop producing land is being lost to urban development, last year it was reported some 4,000,000 acres were lost to food production. This is certainly quite evident in Boise, Meridian, Nampa, Caldwell, Twin Falls, Idaho Falls and to a lesser extent every town in Idaho. This desert entry land, even the marginal land with the aid of soil boosters will be required to fill this increasing gap. Agriculture is Idaho's major form of revenue also of the nations. Increased agriculture production will become increasingly important to overcome our trade deficit. For this reason farm land must be replaced as fast as it is lost. The desert entry program is the only feasible way we can enter farming, as the cost of land and equipment would overwhelm the return on our crops.

We want this land and are prepared to make our entry a success.

Mr. & Mrs. Don Henderson
10649 Longrifle Dr.,
Boise, Idaho, 83709

1. Overlays 1A and 1B illustrates Class I and II soil areas that would be allowed for farm development under the proposed action. The initial soils analysis shows most of the acreage encompassed by your DLA filings I-6507 and I-6508 to be located on Class III soils. Class III soils would not receive emphasis for development under the proposed action level (111,015 acres) of farm expansion. Therefore, only those areas where you are filed on a predominance of Class I and II soils would be allowed for release under the proposed action concept.

5. The BLM seems to feel that they would be able to exert more control over entrymen under a lease, sale or exchange under the FLPMA than they could under DLE or we and they under the Carey Act. The Director, IDWR could control Carey Act development in every way possible that BLM could under FLPMA disposals.

22

6. It seems to imply in the report that pumping power would only be supplied by electricity (pp. 1-8). Although the stages of implementation were patterned after existing agricultural development in the ES area, the trend may change due to increasing cost of electrical power. At present, other alternative power sources such as solar, gasohol, alcohol, or natural gas may be more expensive than conventional electrical power. However, the time frame of development could be up to 10 years from the time entry is allowed (through DLA or CA) to full development of project and technology at that time may have changed.

5

7. Discussion concerning Bruneau Plateau (pp. 1-24) - Title should be Bruneau Plateau Water Development Project. Must be stated that it is proposed by Idaho Water Resource Board. Core drilling has already taken place both at the proposed Grindstone Butte and Saylor Creek Dam Sites (not only Saylor Creek). There is a possibility of small hydroelectric plants in the feeder canal instead of using low head hydro, since potential gross head available at three sites is 100, 260, and 340 feet. Power potential also exists through the releases of water from the reservoir. Feasibility studies have already been funded by the Idaho State Legislature in FY '79-'80.

6

8. Statement that all proposed action development would be watered from highlift pumping, except groundwater (pp. 1-8) - This probably won't be the case. With the 'water bank' entry men could buy water from other upstream users and convey it to the ES area without highlift pumping. An almost unique example is the Canyon View Irrigation (DLA) which bought Rockford water and plans to deliver to its project area at the Bruneau Plateau.

7

9. Engineering assumptions used (pp. 3-1) - Sprinkler head pressure of 70 psi is too high and is not normally used (as pointed out in pp. 1-12). A 50-60 psi sprinkler head pressure is probably what is more reasonable. Energy conservation would encourage the use of intermediate pressure nozzles (50-60 psi) rather than higher pressure nozzles (70 psi or more).

8

10. Another engineering assumption was to use a closed pipe all the way from the river pump to a project area. This is not a valid assumption since the median distance for all lands under the proposed action is 6-8 miles. With this distance, an open canal (lined or unlined) would probably be used. The effect on the energy analysis of a more reasonable assumption would be to lower estimates of energy requirement.

9

11. There seems to be a discrepancy on all maps concerning the boundary of the Saylor Creek Gunnery Range. Based on the information furnished to us by the USAF, Mountain Home (see attached map) some of the proposed lands to be developed fall within the Saylor Creek Gunnery Range (R-3202) approximately 12,000 AC. Is Mountain Home Air Force Base aware of this? The proposed lands to be developed bordered and, in some cases, even encroached the Saylor Creek Gunnery Range. However, no environmental

10

SPECIFIC COMMENTS BY
IDAHO DEPARTMENT OF WATER RESOURCES
ON BOISE DISTRICT AGRICULTURAL DEVELOPMENT
DRAFT ENVIRONMENTAL STATEMENT FOR SOUTHWEST IDAHO

22

assessment was made in this regard. Impact on possible water table build-up (long term basis) was not analyzed.

22

1. The discussion of the district court and ninth circuit decisions is misleading. The district did hold that "the state is guaranteed a maximum entitlement of three million acres of suitable desert land for Carey Act development to select from time to time, which it cannot be deprived of by the Secretary of the Interior, if the state meets the conditions of the Carey Act". While the state "may not perfunctorily select acreage previously withdrawn (by the Secretary) for other purposes," such withdrawals are not valid to prevent Carey Act selection. Rather, the Secretary may not arbitrarily deny the state's application for reclassification. Bureau of Land Management's discussion never mentions the portion of the decision which held that the Secretary is under an obligation to preserve enough desert land suitable for Carey Act development to fulfill the state's right of entitlement.

1

2. The emphasis in item 2 in the discussion of the court decisions should be that a husband and wife may make adjoining entires and that a house on the dividing line between the adjoining tracts satisfies the settlement and residency requirement of the Carey Act. Bureau of Land Management's statement that two persons may jointly occupy a house on the dividing line completely misses the point. This has always been allowed. However, the allowance of a joint entry by a husband and wife was what Bureau of Land Management protested and lost.

2

3. The discretion question on the Carey Act is poorly treated in the EIS. BLM is indicating that they have discretion to refuse the state's requests for specific project lands. The state does not believe this to be the case. We do not feel that BLM has the authority to, for example, just dismiss all of the Carey Act applications that the state has made and elect to have no development. It is the state's prerogative to make those kinds of decisions.

3

4. The draft EIS indicates that a number of laws subsequent to the passage of the Carey Act grant are applicable to the Carey Act grant. The state feels that the grants were made in 1894 and 1908, that they are just that -- grants. The decision was made at that time and, therefore, laws like NEPA, the Taylor Grazing Act, Multiple Use Planning Act, the FLPMA, etc., are not applicable to the Carey Act. That is not to say that the state will not insure that the values that were intended to be protected by those Acts are not given full consideration and are fully protected as needed.

4

12. When referring to the effects on power generation, aquatic environment of the river, etc., of a low water year, 1977 is used as the worst case. This is reasonable, but data should be presented showing how often a year like 1977 could be expected to occur.

11

13. Map 1-3, which shows Carey Act filings, does not appear to agree with Carey Act filings shown on State records (although it was difficult to compare the map to State maps due to its scale). For example, the area shown in yellow as having private exchange applications on it is shown on State records as part of the Narrows II Carey Act Project.

12

14. The acreage table, as well as Table 1-3 on page 1-9, is different from acreages we were previously given. We have 43,709 acres from river diversion and 9376 supplied from groundwater in the Bliss-Strike reach.

13

15. Hydro losses at FCRPS dams - The assumption that all water depleted by this development would have been usable at all FCRPS dams is invalid. The CR&T depletions report (apparently the CE study that is being referred to) does not make that statement. "Pacific NW Energy Environment" (page 2-86) and "Regional Impacts" (page 3-80) also contain this invalid assumption.

14

16. Water Resources - The "editing" of this section is atrocious. Text supplied by IDWR has been cut up and inserted in BLM paragraphs. As written, IDWR has a hard time recognizing the material. Examples:

15

Page 2-8, bottom par: Flow at Idaho Falls - Snake is not measured at Idaho Falls. The numbers quoted cannot be for Idaho Falls. The flows quoted for Milner also are not correct for that location. The sentence on one-fifth of all years, etc. was mostly written by IDWR but it has been referenced to some unidentified PNRBC report.

15

Page 2-9, Table 2-4: October flow at King Hill should be 9174 rather than 9714.

16

Page 2-10, 1st par, 2nd and 3rd sentences: These are incorrect. There is always some flow below Milner. In drought year 1977, flows exceeding 3000 cfs continued well into June.

17

Page 2-12, last par and page 2-13: Surface water use is described in the groundwater section.

18

Page 2-12: The references for groundwater section were omitted from the reference list at back of report.

19

Page 3-9: December flow near Murphy w/proposed action should be 12022 rather than 11890 cfs.

20

Page 3-9, Table 3-3: Source was not IDWR and should not be so footnoted

21

Page 3-11, par 3: "The proposed action does not appear to reduce flows below this figure" (3000 cfs). The proposed action could not lower the flow below that level because it is protected by state law.

22

P. 2-17, Last Parag., 2nd Sentence

PC₄ should read PO₄.

27

P. 2-18, 1st Parag., 1st Sentence

It now reads, "At Buhl and King Hill both NO₃ and total PO₄ are very high . . . for the entire year." It should read, "At Buhl and King Hill both NO₃ and total PO₄ are very high the entire year . . ."

28

P. 2-18, 3rd Paragraph

With the exception of the first sentence, this paragraph lacks verification in reference.

29

P. 2-18, 6th Parag., 2nd Sentence

It reads, "No studies of these forms are available in the ES reach." The word "forms" is out of place in this sentence. It would be better to use "organisms."

30

P. 2-18, 6th Parag., 3rd Sentence

It reads, "The only non-pathogenic (disease associated) form worth special mention is . . ." The words in the parentheses are incorrect. Non-pathogenic is non-disease associated. Once again the use of the word "form" is unacceptable in this sentence. It would be better to use "organism." This sentence should be prefaced by the words "below the ES area."

31

P. 2-18, 6th Parag., Last Sentence

The phrase "both below the ES area" should be deleted.

32

P. 2-21, 2nd Parag., Last Sentence

It reads, "This suggests the heavy contribution of nonpoint surface irrigation returns." Surface irrigation returns are not the only non-point source of coliform contamination.

33

P. 2-22, 4th Paragraph

This paragraph lacks data and reference.

34

P. 2-22, 7th Paragraph

This paragraph implies that groundwater is only available in the Bruneau-Murphy area. This is not true.

35

SPECIFIC COMMENTS ON THE ENVIRONMENTAL STATEMENT ARE:

P. 2-1 through 1-13

These pages are for the most part lacking any references.

P. 2-15, 6th Parag., 3rd Sentence

It reads, "(At 30 JTU, the river would be greenish-brown.)" It is possible that the Snake River could be greenish-brown at the same time that the turbidity measured 30 JTU. However, there is no "standard" correlation between color and turbidity.

23

P. 2-17, 2nd Parag., Last Sentence

This sentence is really awkward. It reads, "Algae contribute heavily in the reach also." It would be better to state, "Algae also contribute to turbidity in this reach."

24

P. 2-17, 6th Parag., 3rd Sentence

The pH increase to 8.9 does not necessarily indicate increased algal production and increased bicarbonate. However, increased algal production and increased bicarbonate concentration can be indicative of an increase in pH.

25

P. 2-17, 7th Parag., 1st Sentence

Measurement of electrical conductivity is a method of determining dissolved substances, but to say it is "the best single measure" is not appropriate.

26

P. 2-22, Last Paragraph

The word "fluoride" is misspelled throughout this paragraph, and the paragraph lacks reference.

36

P. 2-23, 2nd Parag., 3rd Sentence

The word "fluoride" is once again misspelled.

37

P. 2-23

The heading, "Downriver from the ES Area," should be prefaced by the words "Surface Water."

38

P. 2-23, 8th Paragraph

It reads, "Below the ES area to Weiser, summer pH often attains 8.9 indicating both increased algal production . . ." The pH increase to 8.9 does not necessarily indicate increased algal production and increased bicarbonate. However, such increases can be related to an increase in pH.

39

P. 2-24, 1st Line on Page

The word "load" should be changed to "concentration."

40

P. 2-24, 8th Parag., Last Sentence

It reads, "Below Hells Canyon Dam, total live weight is reduced but desirability for game fish increases again." This sentence makes no sense.

41

P. 2-89, Last Parag., 1st Sentence

Where and by whom is it proposed that 1 million additional acres of land will require irrigation in the future?

42

P. 2-90, 1st Parag., Last Sentence

The word "streptococci" is misspelled.

43

P. 3-15, 2nd Parag., 1st Sentence

It states, "Available data indicate that there would be no return of surface water to the underground aquifers and therefore no change in existing quality." If this is true, the data should be referenced.

44

22

22

P. 3-15, 2nd Parag., 2nd Sentence

It reads, "It is possible that there may be some mixing of aquifers where a well passes through two or more." This sentence is poorly constructed and needs explanation and reference.

45

P. 6-2, 1st Parag., 2nd Sentence

It reads, "The 277,827 acre feet of water needed per year for the proposed development would be lost to any other present or future uses." This statement does not allow for the effects of recharge. The proposed action requires 27,827 acre feet of water per year.

46

P. 6-2, 3rd Paragraph

This paragraph refers to degradation of groundwater quality. Throughout this document, there have been several statements saying that groundwater quality would not be adversely impacted by the proposed action.

47

P. 7-1, 4th Paragraph

It reads, "Groundwater supplies would gradually diminish between Bruneau and Murphy as 27,827 acre feet were pumped each year for irrigation in this part of the ES area." The effects of recharge apparently are not considered.

48

P. 8-10, 2nd Parag., Last Sentence

It reads, "Based on current knowledge, this would adversely affect existing users as the aquifer would likely be depleted." This speculation is quite severe and probably incorrect. It needs support and reference.

49

P. 2-18, Last Parag., 1st Sentence

It reads, "Average fecal coliform bacteria (bacteria associated with diseases potentially dangerous to man) are . . ." The statement in parentheses is incorrect. Fecal coliform bacteria are not necessarily associated with diseases potentially dangerous to man. They merely indicate the possible presence of dangerous bacteria.

55

P. 2-21, 2nd Parag., 1st Sentence

It reads, "Total counts of coliform bacteria (not necessarily all pathogenic but an indication of conditions which support dangerous bacteria) are . . ." The statement in parentheses is incorrect. Coliform bacteria indicate the possibility of dangerous bacteria being present. They do not indicate a condition.

56

P. 2-21, 5th Parag., 1st Sentence

It reads, "Ammonia (which may be toxic to aquatic life) concentrations . . ." The statement in the parentheses should read ". . .(which is toxic to aquatic life) . . ."

57

P. 2-21, 5th Parag., 2nd Sentence

We can find no reference to the ammonia guideline in the referenced document. In the same sentence, the 0.30 per liter has no units. It should probably read 0.03 milligrams per liter.

58

P. 2-21, 6th Parag., 1st Sentence

It reads, "The Idaho Department of Health and Welfare has determined arsenic, cadmium, chromium, cobalt, lead, manganese and zinc to be below the maximum permissible 20 milligrams per liter limit in 1976 and 1977." This cannot be correct. The maximum permissible concentration of lead, cadmium, or any of these elements must be below 20 milligrams per liter.

59

P. 2-22, 3rd Parag., Last Sentence

It reads, "Most streams probably cease flowing at some time of the year." This sentence should be more definite. If they don't know, they should find out.

60

P. 2-22, 5th Parag., 1st Sentence

The sentence does not make sense. It should probably read, "Mean summer water quality in Little Valley Creek (a Bruneau River tributary similar to the six named above) was 20.9°C . . ."

61

P. 2-22, 7th Paragraph

It states that discussion of groundwater will be limited to the Bruneau-Murphy area, since this is the area of groundwater availability. The discussion of groundwater should cover the entire ES area since it could be affected

62

22

22

whether the water is being pumped out or not. Irrigation on the surface can still affect the groundwater.

P. 2-17, 6th Paragraph

Parantheses should be closed after "ph 7.0."

50

P. 2-17, Last Parag., 2nd Sentence

It now reads, "The key nutrients, NO₃ and total phosphorous . . ."; it should read, "The key nutrients, NO₃ and phosphorous . . ."

51

P. 2-18, 1st Line

The "r" was left off the word "over."

52

P. 2-18, 3rd Parag., Last Sentence

It reads, "Nitrogen is the other major aquatic plant growth limiting nutrient, but the abundance of nitrogen fixing blue-green algae in the Snake River blooms ensures a high late summer nitrogen supply and phosphorous limits algal growth for most of the summer." The sentence is technically incorrect. Blue-green algae do not "ensure" a late summer nitrogen supply. Because they can "fix" their own nitrogen, it is not the growth limiting nutrient.

53

P. 2-18, 4th Parag., 1st Sentence

The first sentence should be deleted. Nitrates do not "behave" opposite to phosphorous. It could be pointed out that nitrates are more soluble than phosphorous, and therefore will occur in groundwater and runoff; phosphates adsorb to the sediment particles and therefore are not found in agricultural runoff water unless there is suspended sediment also present.

54

P. 2-22, Last Parag., 1st Sentence

It states that groundwater is generally of a sodium bicarbonate type. This sentence is not referenced. Is it a general statement, or are they referring specifically to the Bruneau-Murphy area groundwater?

63

P. 2-23, 1st Paragraph

These statements are not referenced, and again I cannot tell if they're talking about groundwater in general, or a specific aquifer.

64

P. 2-23, 4th Parag., 3rd Sentence

It reads, "The Malheur and Owyhee Rivers deliver lower irrigation loadings to the Snake, but are of low water quality." I believe the word "loadings" is misused in this sentence. If the rivers are of low water quality, they would deliver high loadings to the Snake. The sentence should be reworded.

65

P. 2-23, 5th Parag., 1st Sentence

It reads, "Summer mean temperatures average 21.3°C at Weiser." It should read, "Summer mean water temperatures average 21.3°C at Weiser."

66

P. 2-23, 5th Parag., 2nd Sentence

It states that blue-green algae does not occur below 21°C. This is incorrect.

67

P. 2-23, 6th Parag., 1st Sentence

It reads, "Turbidity increases to 12 JTU (greenish color) at Weiser . . ." It incorrectly insinuates that there is a correlation between the color and the turbidity.

68

P. 2-23, Last Parag., 1st Sentence

It reads, "Conductivity holds at 500 micromhos into Brownlee Reservoir from the ES area; irrigation return flow contributions are offset by the large tributaries of low conductivity." The sentence should state from where into Brownlee Reservoir that the conductivity holds at 500 micromhos. It should also state what large tributaries they're talking about.

69

P. 2-23, Last Parag., Last Sentence

It reads, "Passage through the Hells Canyon reservoirs . . ." It should read, "Passage through Brownlee, Oxbow, and Hells Canyon Reservoir . . ."

70

22

P. 2-24, 1st Parag., Last Sentence

It states, "The decline of total phosphate at Weiser indicates rapid removal from the river by algae . . ." It should read, "The decline of total phosphorous at Weiser results from removal from the river by algae . . ."

71

P. 2-24, 2nd Parag., 1st Sentence

It reads, "After the Snake River has passed through the three Hells Canyon reservoirs . . ." It should read, "After the Snake River has passed through Brownlee, Oxbow and Hells Canyon Reservoirs . . ."

72

P. 2-24, 3rd Paragraph

There are no references to support the data given in this paragraph, and it is difficult to follow. It makes no reference to why the oxygen concentration varies with algal respiration and makes no references to changes in oxygen levels with depth. It should either be more fully explained, dropped, or just stated that there is a dissolved oxygen problem in Brownlee Reservoir.

73

P. 2-24, 4th Parag., 1st Sentence

It states, "Ammonia concentrations in the down river reach below the ES area are lower than the 0.30 milligram per liter state standard." First of all, there is no state standard for ammonia. Second, the "lower than" makes it sound like the river violates the standard.

74

P. 2-24, 4th Parag., 2nd Sentence

Again, the author makes it sound like the heavy metals violate safe limits. The word "below" should be replaced with "within."

75

P. 2-24, 4th Parag., Last Sentence

It reads, "Below Hells Canyon Dam, copper concentrations are similar to those at Weiser." The sentence should be eliminated. It is not relevant.

76

P. 2-24, 7th Paragraph

Aquatic invertebrates should not be included in a water quality section.

77

P. 2-43, 1st Parag., 2nd Sentence

It states that coho salmon are also found below Swan Falls Dam. It should also state where they come from, that they are not found there year-round, and that they are not abundant.

78

22

P. 2-43

It references a 1956 report by Irving and Cuplin. The author might speculate on changes that have occurred since 1956.

79

P. 2-45, Last Parag., 2nd Sentence

The sentence gives Swan Falls Reservoir as an example of a shallow impoundment with severe fluctuations. Swan Falls Reservoir does not fluctuate "severely".

80

P. 2-47, 4th Parag., Last Sentence

It states, "Growth of sturgeon throughout the ES area is excellent." This statement should be supported with data and references.

81

P. 2-88, Last Parag., Last Sentence

Cochnauer (1977) should be referenced.

82

P. 2-90, 3rd Paragraph

I believe the paragraph is inaccurate and should be eliminated. The impact of expensive energy on farm practices would be a very complex subject and could not be treated in one paragraph as it is here.

83

P. 2-90, 4th Parag., 2nd Sentence

It states, "Based on present observations, groundwater levels would continue to drop as much as two feet per year." This should be referenced.

84

P. 2-90, 5th Paragraph

It is difficult to follow what area they are talking about. The second sentence states, "Water applied to the land surface would not find its way back to the aquifer." Water could find its way back to the aquifer through drain wells and/or basalt fractures.

85

P. 2-92, Last Parag., 2nd Sentence

It reads, "This reach has been termed the best sturgeon habitat in sturgeon populations in Magic Valley." This statement is probably true because it is the only sturgeon habitat in Magic Valley. However, there is no data to show that it is the best sturgeon habitat in the Snake River as stated in the last sentence in the paragraph.

86

P. 3-14, Last Paragraph

It states, "Deep movement of water from irrigation to the regional water table is likely to be insignificant because of the great depth to the aquifer

87

and anticipated low vertical hydraulic transfer in the predominately horizontally bedded layers." Is this true in the entire ES area? If so, it should be more fully explained and supported with data or references.

Chapter 4

Under "Mitigation Measures", there is no mention of mitigation for a loss of fisheries. There are many things that could be done to mitigate for the reduced flow impact on fisheries.

88

Letter 22 Responses

1-4. See Letter 7, Response 5.

5. See Letter 7, Response 1.

6. The FES has been corrected.

7. For the purposes of the proposed action in this ES, all irrigation is accomplished by high-lift pumping from the Snake River and a small amount by ground water pumping. This is not to say that there won't be future opportunities for gravity flow canal water delivery (such as the Bruneau Plateau Water Development Project) or "water bank" transfers. High-lift pumping is the means by which the majority of DLA and CA applicants presently propose agriculture development in the ES area. Therefore, this type of water diversion is what the ES is based on and the Preface in the FES clarifies this point. There were a number of comments on the BES concerning irrigation development by off-streams storage. This concept is described in general terms in Chapter 8 of the FES.

8. See Letter 8, Response 4.

9. The assumption of closed pressurized pipe instead of canal--even for the relatively long distance from the river to project area was chosen for several reasons: terrain was a primary consideration. Much of the land would be difficult to reach by canal from Snake River pumping stations because of intervening land of higher elevation. Proposed action land generally is in smaller tracts of contiguous uninterrupted land than existing projects. In addition, land in many areas is interrupted by gullies and steep slopes. To avoid terrain problems, canal routes would have to be long--much longer than the straight line to the closest point on the river that was used as the basis for estimating the distance for closed pipe.

Though canals don't require energy to maintain pressure throughout the system, they do have evaporation and seepage losses that would not occur with closed pipe. Over the long canal distance that would be required, the extra electricity required to make up for water losses could easily equal or exceed electricity needed for pressurization of closed pipe. In a recent study* on Pacific Northwest irrigated agriculture and hydroelectric power, a transportation water loss of 30 percent was used in calculations of electrical requirements for pumping.

In the model used for the electricity calculations in the Environmental Statement, the removal of the portion of the total head resulting from friction in closed pipe and an increase in water diversion requirement of 29 percent to make up for transportation losses yield the same KWH per acre at the 6-8 mile median distance for land

irrigated from the Snake River. The assumption of canals instead of closed pipe for water transportation would make little difference in the estimation of electricity consumption for pumping. An assumption of canals and increased diversions to make up for transportation water losses would however increase downstream hydroelectric losses at IPC and Federal dams. This would increase overall electricity supply to cost impacts.

Engineering reports for several projects in or near the Environmental Statement study area** and in the Horse Heaven Hills area of South Central Washington*** have contained data and discussion on the energy tradeoffs between canal and closed pipe.

In several cases in the ES area a combination of closed pipe and canal are used. The longest run of closed pipe for the four ES area proposed projects examined was in excess of seven miles. Gross water diversion for proposed developments using canals for any part of the transportation was at least 3 acre-feet per acre for all projects.

The Patterson Irrigation Project in Horse Heaven Hills in south central Washington was designed with more than 10 miles of pressurized closed pipe. Greater efficiency in water transportation was one factor in the design of this system.

* An Analysis of the Tradeoff Between Irrigated Agriculture and Hydroelectric Power in the Pacific Northwest; prepared for the U.S. Department of Energy by Battelle Memorial Institute, Pacific Northwest Laboratories. Jan. 1979; p 7-13.

** Feasibility Report. Bruneau Plateau Irrigation Development Idaho. Deadman Flat Project (Grindstone Butte Mutual Canal Company). Prepared by Tudor Engineering Company and G. T. Newcomb, Inc. April 1967.

*** Feasibility Study, Patterson Irrigation Project. Parametrix, Inc. Vancouver, WA. Sept. 1977.

10. A check of BLM Land Office records showed that maps in the ES correctly illustrated the boundary of the Saylor Creek Gunnery Range. A discussion of the effect of the proposed action on water tables can be found in Chapter 3 - Groundwater.

11. A low water year similar to 1977 occurs about one year in eight.

12. Map 1-3 showed the CA applications under temporary withdrawal and permanent segregation status that have been filed with BLM from IDWR. There may be other CA project proposals in the ES area filed with IDWR, however, these have not been forwarded to BLM in accordance with present BLM operating procedures.

The area shown in yellow on Map 1-3 of the DES has been corrected in the FES to reflect the fact that there are no existing valid applications on that land. This land is currently under withdrawal status which segregates it from any disposal type applications, including exchanges and CA applications, until the withdrawal is lifted. In 1976, the Interior Board of Land Appeals upheld the BLM's rejection of the Narrows II CA project for this land and there can be no valid CA application on the land while it is under withdrawn status.

13. Figures have been re-checked. Table 1-3 is correct.

14. In recent years a number of studies addressing tradeoffs between irrigation and hydroelectric generation have been completed for the Columbia River system. These studies have assessed the effects of irrigation depletions on hydroelectric generation.

The Army Corps of Engineers published a report, Irrigation Depletion Instream Flow Study, which examined alternative levels of irrigation development and alternative minimum instream flow levels. This report contains data on the eight run of the river Snake/Columbia River dams affected by proposed action irrigation depletions.

Under current river management average monthly flows in all months are below hydroelectric capacity of these eight dams. Without changes in the operation of upstream storage reservoirs, any reductions in flow over these dams would be expected to result in hydroelectric losses. Summer releases from upstream storage could make up for irrigation depletions; however, this would be at the expense of generating capacity during the winter RW peak load. Under current generating conditions (capacity, stream flow management, 1970 level of depletion), the Corps of Engineers Study lists a small amount of spill at these eight dams. The spill amounts to a total of 85 average yearly MW out of a total generation of 5155 average yearly MW for these eight dams. Much of this, (33 average MW) is at Bonneville Dam where additional capacity is scheduled before 1985. The Corps Study data indicates that essentially all of the water now passing through these eight dams would be useable for generation as was assumed for this ES.

A second study assessing irrigation depletions and hydroelectric losses was recently (January 1979) completed by Battelle Pacific Northwest Laboratory for the U. S. Department of Energy. This study assessed scheduled capacity additions to 1985. Lost hydrogeneration was calculated using values for the average power output at each dam resulting from a change in streamflow at that dam. These values were obtained from Bonneville Power Administration.

Based on the data from this report, the estimation of hydroelectric losses for the eight Snake Columbia dams contained in the Environmental Statement may be slightly underestimated. Based on the hydroelectric loss estimations of the study, streamflow depletion in the Environmental Statement area would result in losses at the eight affected dams of 633 kWh/AF rather than the 618 kWh/AF value used in the Environmental Statement. Based on the study, the annual hydroelectric losses from the proposed action in an average case year would be 152.7 million kWh rather than the 149 million kWh estimated in the Environmental Statement.

References:

- (1) Irrigation Depletion Instream Flow Study, U. S. Army Corps of Engineers, Walla Walla District, December 1976. See especially Appendix A, pages 3-36 and 3-44.
- (2) An Analysis of the Tradeoff Between Irrigated Agriculture and Hydroelectric Power in the Pacific Northwest. Battelle Pacific Northwest Laboratory for the Department of Energy, January 1979, pgs 23-30.

15. Comment is correct. FES text has been changed.

16. This table has been completely revised. IDWR has completed a new base flow study using most recent river modeling (flow management).

17. FES text has been changed.

18. FES text has been changed.

19. Correction made.

20. This table has been changed in the FES to reflect IDWR's updated base flow study.

21. Source for Table 3-3 is U.S. Geological Survey - Water Resources Data, 1977.

22. We acknowledge that State law established a 3,300 CFS minimum flow at Murphy. This is stated in the document. The analysis, however, was intended to analyze how much water is in the river, how much would be removed if the proposed action were implemented, and how much flow would remain. This analysis was directed toward complementing, not ignoring, the State's minimum flow.

23-34. The FES text has been changed in accordance with the comments.

35. The data sources we have available support the contention that groundwater is available in the large quantities needed only in the Bruneau-Murphy area. The State Water Plan--Part II (pages 56-68) states that the Bruneau Plateau (a large part of this study area) has "little developable amounts of water". It further states that this area would require recharge from other sources before groundwater could be developed. Although it is possible that groundwater could be used to irrigate new farmland in some areas other than the Bruneau-Grandview-Murphy area, this development would be very minor in relation to the total 111,015 acres proposed for development.

36-41. The FES text has been changed in accordance with the comments.

42. The State Water Plan--Part II calls for a minimum of 1,105,000 acres (including supplemental water to existing farms) to be developed by the year 2020 with Snake River water.

43. The FES text has been changed in accordance with the comment.

44. Data is based on: Ralston, D. R. and S. L. Chapman. 1969. Groundwater resources of Northern Owyhee County, Idaho. Idaho Department of Reclamation, Water Info Bull. 14. 85 p.

45. The FES text has been changed in accordance with the comment.

46. Because of its uncertain volume and destination, excess irrigation water cannot be considered a reliable water source for other users. The 15 percent return flow may eventually recharge river flows but because of its uncertainty one must consider the total diversion of 277,827 acre feet lost to any other use.

47. As stated elsewhere in this report, the groundwater situation is difficult to assess. Best information available indicates there could be some degradation of groundwater quality, especially at the higher water tables. The extent and severity of this degradation is not expected to be great. But, the best indication is that there would be some degradation.

48. The effects of recharge are not well known. The point to keep in mind is that recharge would be only a fraction of the amount extracted. Hydrographs for several wells in the Bruneau area show a slowly declining water level. The only assumption that can be made is that additional pumping will lower water levels further.

49. Support and reference can be found in several publications. One report--"Ground Water Levels and Well Records for Current Observation Wells in Idaho, 1972-73"--was prepared by the U.S. Geological Survey in cooperation with the Idaho Department of Water Resources. For example, Well #06S, 03E 14BCB1 (7 mi. S. of Grandview) showed a drop in water level from 1953 to 1973, of about 25 feet. This well was unused but its water level was influenced by a nearby well which was used. This report contains hydrographs for 21 wells in Owyhee County. Of the 21 wells, 4 show a rising water level, 6 show a static water level, and 11 show a dropping water level.

50-56. FES text has been changed in accordance with the comments.

22

P. 2-24, 1st Parag., Last Sentence

It states, "The decline of total phosphate at Weiser indicates rapid removal from the river by algae . . ." It should read, "The decline of total phosphorous at Weiser results from removal from the river by algae . . ."

71

P. 2-24, 2nd Parag., 1st Sentence

It reads, "After the Snake River has passed through the three Hells Canyon reservoirs . . ." It should read, "After the Snake River has passed through Brownlee, Oxbow and Hells Canyon Reservoirs . . ."

72

P. 2-24, 3rd Paragraph

There are no references to support the data given in this paragraph, and it is difficult to follow. It makes no reference to why the oxygen concentration varies with algal respiration and makes no references to changes in oxygen levels with depth. It should either be more fully explained, dropped, or just stated that there is a dissolved oxygen problem in Brownlee Reservoir.

73

P. 2-24, 4th Parag., 1st Sentence

It states, "Ammonia concentrations in the down river reach below the ES area are lower than the 0.30 milligram per liter state standard." First of all, there is no state standard for ammonia. Second, the "lower than" makes it sound like the river violates the standard.

74

P. 2-24, 4th Parag., 2nd Sentence

Again, the author makes it sound like the heavy metals violate safe limits. The word "below" should be replaced with "within."

75

P. 2-24, 4th Parag., Last Sentence

It reads, "Below Hells Canyon Dam, copper concentrations are similar to those at Weiser." The sentence should be eliminated. It is not relevant.

76

P. 2-24, 7th Paragraph

Aquatic invertebrates should not be included in a water quality section.

77

P. 2-43, 1st Parag., 2nd Sentence

It states that coho salmon are also found below Swan Falls Dam. It should also state where they come from, that they are not found there year-round, and that they are not abundant.

78

22

P. 2-43

It references a 1956 report by Irving and Cuplin. The author might speculate on changes that have occurred since 1956.

79

P. 2-45, Last Parag., 2nd Sentence

The sentence gives Swan Falls Reservoir as an example of a shallow impoundment with severe fluctuations. Swan Falls Reservoir does not fluctuate "severely".

80

P. 2-47, 4th Parag., Last Sentence

It states, "Growth of sturgeon throughout the ES area is excellent." This statement should be supported with data and references.

81

P. 2-88, Last Parag., Last Sentence

Cochner (1977) should be referenced.

82

P. 2-90, 3rd Paragraph

I believe the paragraph is inaccurate and should be eliminated. The impact of expensive energy on farm practices would be a very complex subject and could not be treated in one paragraph as it is here.

83

P. 2-90, 4th Parag., 2nd Sentence

It states, "Based on present observations, groundwater levels would continue to drop as much as two feet per year." This should be referenced.

84

P. 2-90, 5th Paragraph

It is difficult to follow what area they are talking about. The second sentence states, "Water applied to the land surface would not find its way back to the aquifer." Water could find its way back to the aquifer through drain wells and/or basalt fractures.

85

P. 2-92, Last Parag., 2nd Sentence

It reads, "This reach has been termed the best sturgeon habitat in sturgeon populations in Magic Valley." This statement is probably true because it is the only sturgeon habitat in Magic Valley. However, there is no data to show that it is the best sturgeon habitat in the Snake River as stated in the last sentence in the paragraph.

86

P. 3-14, Last Paragraph

It states, "Deep movement of water from irrigation to the regional water table is likely to be insignificant because of the great depth to the aquifer

87

and anticipated low vertical hydraulic transfer in the predominately horizontally bedded layers." Is this true in the entire ES area? If so, it should be more fully explained and supported with data or references.

Chapter 4

Under "Mitigation Measures", there is no mention of mitigation for a loss of fisheries. There are many things that could be done to mitigate for the reduced flow impact on fisheries.

88

Letter 22 Responses

1-4. See Letter 7, Response 5.

5. See Letter 7, Response 1.

6. The FES has been corrected.

7. For the purposes of the proposed action in this ES, all irrigation is accomplished by high-lift pumping from the Snake River and a small amount by ground water pumping. This is not to say that there won't be future opportunities for gravity flow canal water delivery (such as the Bruneau Plateau Water Development Project) or "water bank" transfers. High-lift pumping is the means by which the majority of DLA and CA applicants presently propose agriculture development in the ES area. Therefore, this type of water diversion is what the ES is based on and the Preface in the FES clarifies this point. There were a number of comments on the DES concerning irrigation development by off-streams storage. This concept is discribed in general terms in Chapter 8 of the FES.

8. See Letter 8, Response 4.

9. The assumption of closed pressurized pipe instead of canal--even for the relatively long distance from the river to project area was chosen for several reasons: terrain was a primary consideration. Much of the land would be difficult to reach by canal from Snake River pumping stations because of intervening land of higher elevation. Proposed action land generally is in smaller tracts of contiguous uninterrupted land than existing projects. In addition, land in many areas is interrupted by gullies and steep slopes. To avoid terrain problems, canal routes would have to be long--much longer than the straight line to the closest point on the river that was used as the basis for estimating the distance for closed pipe.

Though canals don't require energy to maintain pressure throughout the system, they do have evaporation and seepage losses that would not occur with closed pipe. Over the long canal distance that would be required, the extra electricity required to make up for water losses could easily equal or exceed electricity needed for pressurization of closed pipe. In a recent study* on Pacific Northwest irrigated agriculture and hydroelectric power, a transportation water loss of 30 percent was used in calculations of electrical requirements for pumping.

In the model used for the electricity calculations in the total Environmental Statement, the removal of the portion of the head resulting from friction in closed pipe and an increase in water diversion requirement of 29 percent to make up for transportation losses yield the same KWH per acre at the 6-8 mile median distance for land

irrigated from the Snake River. The assumption of canals instead of closed pipe for water transportation would make little difference in the estimation of electricity consumption for pumping. An assumption of canals and increased diversions to make up for transportation water losses would however increase downstream hydroelectric losses at IPC and Federal dams. This would increase overall electricity supply to cost impacts.

Engineering reports for several projects in or near the Environmental Statement study area** and in the Horse Heaven Hills area of South Central Washington*** have contained data and discussion on the energy tradeoffs between canal and closed pipe.

In several cases in the ES area a combination of closed pipe and canal are used. The longest run of closed pipe for the four ES area proposed projects examined was in excess of seven miles. Gross water diversion for proposed developments using canals for any part of the transportation was at least 3 acre-feet per acre for all projects.

The Patterson Irrigation Project in Horse Heaven Hills in south central Washington was designed with more than 10 miles of pressurized closed pipe. Greater efficiency in water transportation was one factor in the design of this system.

* An Analysis of the Tradeoff Between Irrigated Agriculture and Hydroelectric Power in the Pacific Northwest; prepared for the U.S. Department of Energy by Battelle Memorial Institute, Pacific Northwest Laboratories. Jan. 1979; p 7-13.

** Feasibility Report. Bruneau Plateau Irrigation Development Idaho. Deadman Flat Project (Grindstone Butte Mutual Canal Company). Prepared by Tudor Engineering Company and G. T. Newcomb, Inc. April 1967.

*** Feasibility Study, Patterson Irrigation Project. Parametrix, Inc. Vancouver, WA. Sept. 1977.

10. A check of BLM Land Office records showed that maps in the ES correctly illustrated the boundary of the Saylor Creek Guntery Range. A discussion of the effect of the proposed action on water tables can be found in Chapter 3 - Groundwater.

11. A low water year similar to 1977 occurs about one year in eight.

12. Map 1-3 showed the CA applications under temporary withdrawal and permanent segregation status that have been filed with BLM from IDWR. There may be other CA project proposals in the ES area filed with IDWR, however, these have not been forwarded to BLM in accordance with present BLM operating procedures.

The area shown in yellow on Map 1-3 of the DES has been corrected in the FES to reflect the fact that there are no existing valid applications on that land. This land is currently under withdrawal status which segregates it from any disposal type applications, including exchanges and CA applications, until the withdrawal is lifted. In 1976, the Interior Board of Land Appeals upheld the BLM's rejection of the Narrows II CA project for this land and there can be no valid CA application on the land while it is under withdrawn status.

13. Figures have been re-checked. Table 1-3 is correct.

14. In recent years a number of studies addressing tradeoffs between irrigation and hydroelectric generation have been completed for the Columbia River system. These studies have assessed the effects of irrigation depletions on hydroelectric generation.

The Army Corps of Engineers published a report, Irrigation Depletion Instream Flow Study, which examined alternative levels of irrigation development and alternative minimum instream flow levels. This report contains data on the eight run of the river Snake/Columbia River dams affected by proposed action irrigation depletions.

Under current river management average monthly flows in all months are below hydroelectric capacity of these eight dams. Without changes in the operation of upstream storage reservoirs, any reductions in flow over these dams would be expected to result in hydroelectric losses. Summer releases from upstream storage could make up for irrigation depletions; however, this would be at the expense of generating capacity during the winter RW peak load. Under current generating conditions (capacity, stream flow management, 1970 level of depletion), the Corps of Engineers Study lists a small amount of spill at these eight dams. The spill amounts to a total of 85 average yearly MW out of a total generation of 5155 average yearly MW for these eight dams. Much of this, (33 average MW) is at Bonneville Dam where additional capacity is scheduled before 1985. The Corps Study data indicates that essentially all of the water now passing through these eight dams would be useable for generation as was assumed for this ES.

A second study assessing irrigation depletions and hydroelectric losses was recently (January 1979) completed by Battelle Pacific Northwest Laboratory for the U. S. Department of Energy. This study assessed scheduled capacity additions to 1985. Lost hydrogeneration was calculated using values for the average power output at each dam resulting from a change in streamflow at that dam. These values were obtained from Bonneville Power Administration.

Based on the data from this report, the estimation of hydroelectric losses for the eight Snake Columbia dams contained in the Environmental Statement may be slightly underestimated. Based on the hydroelectric loss estimations of the study, streamflow depletion in the Environmental Statement area would result in losses at the eight affected dams of 633 KWH/AF rather than the 618 KWH/AF value used in the Environmental Statement. Based on the study, the annual hydroelectric losses from the proposed action in an average case year would be 152.7 million KWH rather than the 149 million KWH estimated in the Environmental Statement.

References:

- (1) Irrigation Depletion Instream Flow Study, U. S. Army Corps of Engineers, Walla Walla District, December 1976. See especially Appendix A, pages 3-36 and 3-44.
- (2) An Analysis of the Tradeoff Between Irrigated Agriculture and Hydroelectric Power in the Pacific Northwest. Battelle Pacific Northwest Laboratory for the Department of Energy, January 1979, pgs 23-30.

15. Comment is correct. FES text has been changed.

16. This table has been completely revised. IDWR has completed a new base flow study using most recent river modeling (flow management).

17. FES text has been changed.

18. FES text has been changed.

19. Correction made.

20. This table has been changed in the FES to reflect IDWR's updated base flow study.

21. Source for Table 3-3 is U.S. Geological Survey - Water Resources Data, 1977.

22. We acknowledge that State law established a 3,300 CFS minimum flow at Murphy. This is stated in the document. The analysis, however, was intended to analyze how much water is in the river, how much would be removed if the proposed action were implemented, and how much flow would remain. This analysis was directed toward complementing, not ignoring, the State's minimum flow.

23-34. The FES text has been changed in accordance with the comments.

35. The data sources we have available support the contention that groundwater is available in the large quantities needed only in the Bruneau-Murphy area. The State Water Plan--Part II (pages 56-68) states that the Bruneau Plateau (a large part of this study area) has "little developable amounts of water". It further states that this area would require recharge from other sources before groundwater could be developed. Although it is possible that groundwater could be used to irrigate new farmland in some areas other than the Bruneau-Grandview-Murphy area, this development would be very minor in relation to the total 111,015 acres proposed for development.

36-41. The FES text has been changed in accordance with the comments.

42. The State Water Plan--Part II calls for a minimum of 1,105,000 acres (including supplemental water to existing farms) to be developed by the year 2020 with Snake River water.

43. The FES text has been changed in accordance with the comment.

44. Data is based on: Ralston, D. R. and S. L. Chapman. 1969. Groundwater resources of Northern Owyhee County, Idaho. Idaho Department of Reclamation, Water Info Bull. 14. 85 p.

45. The FES text has been changed in accordance with the comment.

46. Because of its uncertain volume and destination, excess irrigation water cannot be considered a reliable water source for other users. The 15 percent return flow may eventually recharge river flows but because of its uncertainty one must consider the total diversion of 277,827 acre feet lost to any other use.

47. As stated elsewhere in this report, the groundwater situation is difficult to assess. Best information available indicates there could be some degradation of groundwater quality, especially at the higher water tables. The extent and severity of this degradation is not expected to be great. But, the best indication is that there would be some degradation.

48. The effects of recharge are not well known. The point to keep in mind is that recharge would be only a fraction of the amount extracted. Hydrographs for several wells in the Bruneau area show a slowly declining water level. The only assumption that can be made is that additional pumping will lower water levels further.

49. Support and reference can be found in several publications. One report--"Ground Water Levels and Well Records for Current Observation Wells in Idaho, 1972-73"--was prepared by the U.S. Geological Survey in cooperation with the Idaho Department of Water Resources. For example, Well #06S, 03E 14BCB1 (7 mi. S. of Grandview) showed a drop in water level from 1953 to 1973, of about 25 feet. This well was unused but its water level was influenced by a nearby well which was used. This report contains hydrographs for 21 wells in Owyhee County. Of the 21 wells, 4 show a rising water level, 6 show a static water level, and 11 show a dropping water level.

50-56. FES text has been changed in accordance with the comments.

57. Do not agree. Ammonia is only toxic to aquatic life at high concentrations. In fact, it is a preferred N form of many algae and macrophytes.

58. Partly accepted. The ammonia guideline is referenced in the specific document (Vol. II, p. 5 and also as a threshold line on the total ammonia figures found throughout Vol. II). That guideline is 0.2 mg/l, not 0.3 mg/l.

The commenter's suggestion that 0.03 is probably correct rather than 0.3 undoubtedly refers to the 0.02 guideline for un-ionized NH₃ — in all our discussions we have only mentioned total NH₃ for which 0.2 mg/l is the correct guideline value. Hence, lines 5 and 6, par. 5, p. 2-21 of the DES has been changed to "—concentrations are lower than the 0.20 mg/l guideline set by the State of Idaho (IDHW 1978)—".

59-61. The FES text has been revised in accordance with the comments.

62. As stated before, the Bruneau-Murphy area is generally recognized by water agencies as the area with most promise for groundwater development. Groundwater supplies in the remainder of the ES area are either very deep, non-existent, or of too little volume to support irrigation needs. See Response to Comment 35 and 47.

63-64. The FES text has been revised in accordance with the comments.

65. Disagree. The Owyhee and Malheur each deliver lower loadings to the Snake than does the Boise River because their flow volumes are lower. So their loadings are lower even though pollutant concentrations are higher than the Boise. Loadings is the correct word.

66-73. The FES text has been revised in accordance with the comments.

74. Refer to Response 58.

75-76. The FES text has been revised in accordance with the comments.

77. Disagree, not an important point.

78. The FES has been changed in accordance with the comment.

79. Rejected. Speculation is not warranted in this case. We have no information to indicate the ratio of game to non-game fishes has changed.

80-84. The FES has been changed in accordance with the comments.

85. The majority of water applied to the land surface would not find its way back to the aquifer. FES text clarifies this.

86-87. The FES has been changed in accordance with the comments.

88. See Letter 8, Response 7.

Route 3 Box 202
Buhl, Idaho 83316
June 25, 1979

Mr. Dean Bibles
Director, Boise Dist. BLM
230 Colling Road
Boise, Idaho 83702

Dear Mr. Bibles,

I would like this letter made a part of the hearing record, regarding the study done by your district on the proposed development of the desert lands in South-West Idaho.

I am a rancher in the Buhl area. My graze is all private, but I know the importance of the public grazing to most of the area ranchers.

I believe the land in question would be best left as it is, in multiple use.

High lift pumping is not feasible even now. And there is a surplus of most crops.

Let's not force our ranchers and farmers to go broke by developing land we don't need at present.

I recommend no development at this time. And an enlarged Birds Of Prey Area to protect the food supply of the raptors, so long as grazing is allowed in the area.

Sincerely yours,

Roy H. Couch
Roy H. Couch

RHC:dfc

Route 3 Box 202
Buhl, Idaho 83316
June 25, 1979

Mr. Dean Bibles
Director, Boise Dist. BLM
230 Collins Road
Boise, Idaho 83702

Dear Sir,

Re: BLM hearing on ag development of South-West Idaho.

Enclosed are copies of a series of articles, and an editorial which appeared in The Twin Falls daily newspaper. And a resolution adopted by the Prairie Falcon Audubon Society.

The members of the Prairie Falcon Audubon Society would like these items to become a part of the hearing record along with the testimony presented by Jeff Ruprecht at the Twin Falls Hearing on June 13, 1979.

Sincerely yours,

Doris F. Couch
Doris F. Couch
Acting Chairman
Prairie Falcon
Audubon Society

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ADOPTED UNANIMOUSLY BY THE PRAIRIE FALCON CHAPTER OF THE NATIONAL AUDUBON SOCIETY, JUNE 7, 1979

COPY

We support the recommended alternative of development of 28,000 acres of land, endorsed by Bureau of Land Management State Director William Mathews.

We believe additional development would threaten populations of raptors and other birds, particularly those which inhabit the Birds of Prey Natural Area. This additional development would therefore be detrimental to the people of the Magic Valley and of Idaho.

In addition to perspective on the impact of the proposed action on farm-level prices of existing farmers, the final statement should also include a section analyzing the synergistic impact of the proposed action on existing Idaho farmers. I.e., the sum of impacts resulting from lower farm-level prices (if that is found to be the case), higher energy costs, etc. For clarity and utility, a "typical" existing farm operation could be used.

2

In my view, this kind of perspective is mandatory if the public and BLM are to make sound judgments on the merits of the proposed action for Idaho, and, whether the proposed action is indeed "in the national interest" as required by the Federal Land Management and Policy Act of 1976.

In addition to these major deficiencies, I believe the public and governmental decision makers would benefit from information on the amount of farmland currently idle under various taxpayer-funded set-aside programs. This accounting should include all land in Idaho and elsewhere in the U.S. which once produced or is capable of producing crops that would be grown on the land covered by the proposed action. Here again, best estimates will suffice for perspective. It would also be instructive to know the general nature and magnitude of any price supports or other taxpayer-financed subsidies for these crops.

3

Finally, if the decision is ultimately made to convert additional public land in southwestern Idaho to private irrigated agriculture, it should be done on a businesslike basis to insure the public receives fair market value for its property consistent with the basic tenants of our free enterprise system. This can be accomplished via the sale or leasing provisions of FLPMA.

Thank you for the opportunity to make these brief comments for the record.

Sincerely,

Ed Chaney

Ed Chaney

ED CHANEY • Rural Route 1 • Eagle, Idaho 86616 • (208) 868-0714

June 26, 1979

25

Dean Bibles
District Manager
Boise District BLM
230 Collins Road
Boise, Idaho 83702

RE: Agricultural Development Draft Environmental Statement for Southwest Idaho

Dean Bibles:

I would like to submit the following brief comments on the draft environmental statement.

In my view, the statement is generally a good effort at analyzing the potential implications of converting additional public lands in southwestern Idaho to private, irrigated agriculture.

I was particularly impressed with the effort to analyze the energy implications. I recognize the difficulties in quantifying these implications. While you are sure to get a great deal of argument about the specific numbers used, the perspective provided should be invaluable to concerned citizens and BLM decision makers.

There are several issues that merit attention as your staff develops the final environmental statement - issues either not present or given incomplete treatment in the draft:

In my view the draft virtually avoids one of the most important issues inherent in converting additional public land in southwestern Idaho to private farmland, i.e., the impact on farm-level prices to existing Idaho farmers. I say virtually, because one study on potato prices is briefly cited.

This failure alone makes it impossible to determine whether or not additional agricultural development is in Idaho's interest, let alone the nation's.

I am sensitive to the fact that predicting market impacts is fraught with difficulties. I seek not the ultimate treatise on marketplace implications of the proposed action, but reasonable, essential perspective on the kinds and relative magnitudes of potential marketplace impacts. This kind of perspective is available from personnel of Idaho's universities and the private sector.

Letter 25 Responses

1. A more up to date and realistic analysis on the impact to potato prices from agricultural expansion is found in Chapter 3 for the proposed action and Chapter 8 for the alternatives. This analysis is based on a report contracted by the BLM and produced by Dr. Leroy Blakeslee, Department of Agriculture Economics, Washington State University.

After consultation with agricultural economists, it was determined that the levels of farm expansion covered in this ES would not noticeably affect commodity prices of the other crops grown (sugar beets, dry beans, wheat, barley, alfalfa) with the assumed rotation (see Chapter 1). This is primarily because, these other crops, unlike potatoes are more commonly grown across the nation. In the case of sugar beets, prices paid to farmers would relate more to the foreign sugar import competition. Dry beans produced from the proposed action, assuming crop composition and yield depicted in Chapter 1, would be less than the annual production fluctuation nationwide. The same circumstances would exist for winter wheat and barley. The small amount of alfalfa hay would probably be sold locally and subject to changing cattle feed needs. With these conditions, predicting price affects from raising these crops in the ES area would be too speculative.

2. The existing farmers in the Idaho Power Company's service area would experience higher energy costs due to the proposed action (see the section on Energy Impacts) and those growing potatoes would anticipate slightly lower potato prices - about 7 cents per hundred weight (cwt.) for the proposed action, about 9 cents per cwt. for the maximum development alternative and about 1 cent per cwt. for the minimum development alternatives (see potato price affects, Chapter 3 and 8).

3. The amount of farmland idle under set-aside and similar taxpayer-funded programs varies considerably from year to year. In 1979 there were about 21 million acres idle in the nation. The following table shows acres idle under federally funded programs in Idaho.^{1/}

Year	Acres	Year	Acres
1979	393,000	1974	0
1978	292,500	1973	245,700
1977	0	1972	(data coming)
1976	0	1971	421,200
1975	0	1970	(data coming)

^{1/} Idaho Annual Reports, U.S.D.A., Agric. Stabilization and Conservation Service

The projection for 1980 is that there will be no set-aside program, but there may be some acres diverted (left idle) under other programs in Idaho.

Price support and other subsidy programs are more constant than set-aside and diversion programs. There are a number of programs designed to stabilize agricultural production through loan guarantees, disaster payments, deficiency payments as well as actual payments to idle land from production. The following table shows the funds expended in Idaho for all program payments, 1970 through 1979. 1/

Year	Total Payment	Year	Total Payment
1979	not available	1974	13,029,719
1978	50,904,864	1973	33,295,908
1977	50,753,098	1972	35,695,889
1976	1,521,050 ^{2/}	1971	44,767,861
1975	9,822,718	1970	47,767,861

Also see Letter 60, Response 1.

1/ Idaho Annual Reports, U.S.D.A., Agric. Stabilization and Conservation Service

2/ Incomplete Information

Boise District Agriculture Development
Draft Environmental Statement
June 28, 1979
Page 2

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The cost of development of this land and the energy required to put it into production in this time of high inflation and an unsound economy is impractical. We urge that alternative number three - allow no farm development - be followed in regards to the Boise District Agricultural Development plan.

Sincerely,

Stanley T. Boyd
Stanley T. Boyd
Executive Secretary

STB:tc

STEWART CRUCKSHANK, PRESIDENT
PARMA, IDAHO

MAURICE GUERRY, JR. VICE PRESIDENT
BURL, IDAHO

STAN BOYD, EXECUTIVE SECRETARY
BOISE, IDAHO

WILBUR F. WILSON, President

LUCILLE A. WILSON, Secretary

Idaho Wool Growers Association

EXECUTIVE COMMITTEE

P. O. BOX 2596

BOISE, IDAHO 83701

PHONE 344-2271

EXECUTIVE COMMITTEE

DIRECTOR AT LARGE
DENNIS BURKS, RUPERT

EASTERN DISTRICT
JEFF SIDGOWAY, ST. ANTHONY

DIRECTOR AT LARGE
EVERETT DECORA, TENDOO

WESTERN DISTRICT
COLIN McLEOD, JR., CALDWELL

DIRECTOR AT LARGE
HENRY ETCHERRY, RUPERT

CENTRAL DISTRICT
LAIRD NOH, KIMBERLY

June 28, 1979

HAMMETT LIVESTOCK COMPANY
HAMMETT, IDAHO 83627

July 2, 1979

27

Boise District Agriculture Development
Draft Environmental Statement
District Manager, BLM
230 Collins Road
Boise, ID 83702

26

Dear Sirs:

Please accept this letter as written testimony concerning the Boise District Agriculture Development Draft Environmental Statement.

The Idaho Wool Growers Association wishes to go on record as supporting main alternative number three which would allow no farm development.

Idaho Wool Growers at this time are facing grazing cuts from several different government agencies and their respective programs. We feel our industry, which is a vital part of Idaho and American agriculture, is being threatened by government actions that are being taken with little or no regard to the consequences of such actions. The BLM grazing cuts in the Challis E.I.S. area and the resulting sell-out of ranches to developers as a result of these grazing cuts is but one example.

The farm development of public grazing land within the Boise District would disrupt several historical and established range operations. The E.I.S. points out that 127 operators in 24 allotments would lose a total of approximately 14,975 AUM's of grazing each year. Scattered farm location would make it unfeasible for many operators to continue grazing livestock on the public land remaining amidst the farms, and in some allotments, effective grazing could no longer be made within the E.S. area. Therefore, as much as 41,397 AUM's per year could actually be lost rather than 14,975 AUM's.

Total active grazing qualifications (AUM's) for sheep amount to 17,279 AUM's. This results in a total carrying capacity of 86,395 head of sheep. Without spring grazing permits Wool Growers would be forced to dry lot their lambs which would increase overhead costs and make their operations infeasible and economically impractical. This would most likely deal a serious blow to the Idaho Sheep Industry.

Mr. D. Dean Bibles
District Manager
U. S. Bureau of Land Management
Boise District Office
230 Collins Road
Boise, Idaho 83702

Dear Mr. Bibles:

Please accept this letter as my comment on the "Boise District Agricultural Development Draft Environmental Statement for Southwest Idaho". I am a livestock operator on public lands included in the proposed action.

Data presented in the Draft Environmental Statement indicates that the Saylor Creek Allotment includes approximately 74% of the public land included in the proposed action and also the Saylor Creek Allotment involves approximately 60% of the public land within the ES area. The data further sets out that livestock grazing use to be eliminated by the loss of public lands included in the proposed action will result in an approximate 23% reduction in the Saylor Creek Allotment. It is further set out that overall, total impacts resulting from the reduction in grazing use, scattering of farm locations, and inadvertent interference of livestock operations could cause a loss of all the AUMs in the ES area in the Saylor Creek Allotment which in effect would amount to a 52% reduction of grazing qualifications in the Saylor Creek Allotment.

It is further set out under environmental impacts of the proposed action, "to adjust to these reductions, each operator will have to either reduce operations accordingly, go out of business, or try to find another grazing location".

1. The FES has been revised to include the Hammett Livestock Company grazing privileges in the Hammett Allotments No. 1, 2 and 4 and Chalk Flat Allotment.

Those operators that choose to stay in the business, but reduce their operations would essentially retain their previous fixed overhead costs and would have a reduced operating base which would result in an unbalanced and uneconomical operation. The alternative of going out of business essentially means that the present operator would sell his operation to a new operator and the new operator would have the same unbalanced and uneconomical operation. The alternative to try and find another grazing location also results in a reduced operation for another party for the reason that no new grazing locations can be located at no cost and, as a result, any new grazing location would have to be purchased from another person for a price and the seller would then be the individual with a reduced, unbalanced, and uneconomical operation.

It makes no difference as to which one of the alternatives are taken. The end result is either the first, second, or third party becomes an operator of an unbalanced, uneconomic operation.

The ES Statement attempts to estimate in terms of dollars the cost of the initial loss of AUMs as a result of the proposed action. This estimate in dollars does not consider the losses sustained by the livestock operator which are damages to the remainder of the operation which is an unbalanced, uneconomic operation.

Livestock operations are based on a full twelve months operation. The loss of grazing use as a result of the proposed action is actually a loss of grazing use on a seasonal basis and, as a result, causes the operator to convert portions of his remaining operation to a season of use for which it is not customarily and properly used and results in poor land management and excessive cost.

The livestock operations involved in the proposed action are extensive to say the least. These operations are self-sustaining, are economically balanced, and produce a product which is processed further before delivery to the consumer, thus creating additional employment and services within the local and national business community.

The loss of grazing use as a result of the proposed action, which appears to be minimal on the surface, will in fact seriously endanger the continuation of the extensive livestock operations involved in the ES area.

The Draft ES Statement indicates an uncertainty of available water for irrigation purposes for the farms in the proposed action due to the uncertainty of minimum stream flow requirements and undetermined water uses in the future upstream from the areas involved in the proposed action. The Draft ES also indicates that a power supply is not now available for the proposed farms in the proposed action and if such energy supplies were to become available, it appears that those energy supplies would only become available at a cost to others in the power service area who will not receive direct or indirect benefits from the planned development.

It does appear that the proposed action will eliminate a very extensive acreage of range reseeding and other range improvements which are the result of rather extensive expenditures of public funds.

The proposed action appears to be economically unsound due to uncertainty of availability and cost of adequate irrigation water supply and energy sources for the proposed farms. The added cost for reimbursement for range reseeding and other range improvements together with added costs for wildlife habitat enhancement, sanitary landfills, and other sites, all of which would be additional public costs, all further detract from the economic feasibility of the proposed action. These costs together with the extensive costs of the losses that will be sustained by the present existing livestock operations indicate that the proposed action is not in the public interest.

Hammett Livestock Company has grazing privileges in Hammett Allotments No. 1, 2, and 4 and Chalk Flat Allotment which do not appear in the ES Statement which is an apparent oversight. Loss of grazing use in these allotments is also very critical to the Hammett Livestock Company operation and will further compound the problems to be encountered should the proposed action be adopted.

In conclusion, it is my recommendation, in view of good land management and economic stability for the community, that the proposed action should not be adopted and that Alternative No. 3 be adopted as stated.

Very truly yours,
HAMMETT LIVESTOCK COMPANY
Wilbur F. Wilson
Wilbur F. Wilson

GWINN RICE RANCH, INC.
BOX 131 • HILL CITY, IDAHO 83337

MEMO-LETTER*

TO *State BLM Office
Boise, Idaho
Basin District*

DATE *July 1979*
SUBJECT *Agricultural development BLM*

Dear Mr Bibbes
In behalf of the livestock industry I would like to make a statement against opening up the BLM land in the Blinnis Ferry Area to agricultural development using grazing land.

We need the grazing land & are over producing in crops now.

Thank you for your consideration

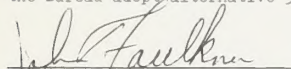
Gwinn Rice

a yearly basis. Unlike fall use, there is no viable replacement for spring use, once the land is taken for agricultural development. Thus, a reduction of grazing use in the Saylor Creek Allotment becomes in reality a reduction in the operations of the users.

Another factor to be considered here is the present draft of the Shoshone District's Grazing EIS for the Bennett Hills area. This draft, should its proposed action be implemented, would cut livestock use by an average of thirty-five percent. Many of the sheepmen who have use in the Saylor Creek Allotment also have use in the Bennett Hills Area. Ironically, it has been suggested that any loss of use that the users sustain under the Grazing EIS be made up by use of their nonuse AUMs in the Boise District. Most nonuse AUMs in the Saylor Creek Allotment have already been converted to cattle use. Thus few, if any, nonuse AUMs are available.

Further, the loss of spring use in the Saylor Creek Allotment and the resulting reduction in sheep numbers would also have an effect on Forest Service lands. A lot of Forest Service reserve would have to go into nonuse due to the lack of livestock to graze it during the summer.

In light of the above, it is my conclusion that should the proposal be implemented, it would cripple an industry that has made successful use of the land involved; an industry that has, in partnership with the BLM, helped to plant vast acreages of crested wheat grass and developed other improvements upon the land; an industry that has had few if any of the adverse impacts that agricultural development will have, nor will be need to be subsidized by the power rate users. Thus, I would recommend that the Bureau adopt alternative 3 (no development) of the draft.


John Faulkner
President, Gooding Sheep Association

DATE: 29 June 1979

COMMENT: At present, 26 bands of sheep use the Saylor Creek Allotment during the spring, and 6 bands use it in the fall. These are as follows:

Spring Use	#Bands	Fall Use	#Bands
Astorquia	2	Astorquia	1
Arkoosh	4	Brailsford	2
Brailsford	3	Faulkner	3
Faulkner	7	Noh	1
Jones	2	Wilson	2
Guerry	1		
Patterson	1		
Sliman	2		
Wilson	4		
	26		9

Should the proposed action be implemented, each of these operators would face a 23-29% cut. This would be an overall reduction of approximately 6.5 bands during the spring and 2.25 during the fall.

Use of the Saylor Creek Allotment, by sheep, happens in the early spring and late fall. Spring use begins usually sometime around the 20th of March. This early spring use is important to the users for two reasons. First, it allows the user to get his livestock out on grass, and off of hay. Hay being a major expense in any livestock operation. The earlier he is able to put his animals on spring pasture, the better his profit picture will be. Second, sheep cannot or will not utilize the crested wheat grass seedlings once they become old and tough. Cattle, on the otherhand, will eat crested wheat grass once it is mature. Sheep must have the young, tender shoots that the grass produces in the early spring.

Should the proposed action be implemented and the cuts in livestock use made, it would result in a reduction of approximately one out of every four bands of sheep which now use the Saylor Creek Allotment. This reduction would primarily be caused by the loss of spring use. Most of the sheep operators in the allotment are there for the early spring and then move north to higher, wetter ground, mostly owned by the BLM and Forest Service, as the summer progresses. Fall use occurs in the late fall, beginning in the latter part of October or the early part of November. Fall use might be replaced by the purchase of pasture from area farmers. It is questionable weather or not this replacement pasture would be available on

550 N. 8 E.
Mountain Home, Idaho 83647
June 27, 1979

United States Dept. of Interior
District Manager
Bureau of Land Management
220 Collins Road
Boise, Idaho 83702

Dear Sir;

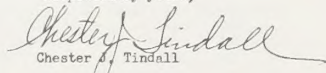
At the June 12 meeting at Murphy I asked permission to testify, in writing, regarding agriculture development of public lands.

Our needs change from time to time and while there is a surplus of some farm commodities at present, it would be a serious error to permanently lock up any specific amount of land from development. I feel people should come first and we should be ready and able to draw on more land as our needs dictate. We should not create any obstacle that would hamper that program. Hopefully this would come to pass before we lose our water rights.

Even the birds of prey area should rank second to our necessities and should be moved to a remote area and these lands opened up to development where feasible.

I feel the old American system of supply and demand is still the best if it comes about in a slow and orderly manner and there should be no limit applied. Since your alternatives require a limit, I would say the full 176,310 acres should be available for future use under the Desert Land and Carey acts.

Respectfully yours,


Chester A. Tindall

BRUCE BOWLER
LAWYER
244 SONNA BUILDING
BOISE, IDAHO 83702
PHONE 343-8012

June 28, 1979

Dean D. Bibles
District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Manager Bibles:

I appreciate your supplying to me draft Environmental Statement, Boise District Agricultural Development for my examination and comment.

Your agency has done a good comprehensive job of detailing the considerations and issues over agricultural development of the land involved from which it is not difficult for me to conclude that bottom line the basic project is a big bummer.

The time has long since passed that the Federal Government should subsidize the speculators in this kind of promotion for development of public lands under Desert Entry or Carey Act. The beneficiaries of this kind of project are the industries peddling irrigation pipe and mechanical water distribution systems and attendant agra-industry machinery.

Given the lack of adequate water and energy intensive mechanics of development, the action could only serve to compete with present local farmers which the Federal Government should not be party to. There is no good modern rationale for giving the public lands away in this context. All of the factors are bad for most everyone except the speculative promoters and the wealthy insurance companies that fund the processes with tax loss benefits to them if the quick speculative exchange fails, operating to the detriment of the public interest in the public lands.

Idaho remains the only state that continues to monkey around substantially with Desert Entry and Carey Act rejuvination for which our Congressional delegation should be faulted; and I hope that your better administrative judgment can head this action off before disaster occurs from trying to develop these public lands. Alternative 3 gets my vote now.

Thank you very kindly.

Respectfully yours,

Bruce Bowler
Bruce Bowler

BB/kmk

cc: Hon. Cecil D. Andrus

Reclamation. Under Appendix 3-2, Farm Budgets, the amortization payment by the farmer on an irrigation pumping system and pipeline (including interest) is \$92.43/acre. The Indian Irrigation Project included the construction of 11 miles of access roads and a domestic water system in addition to the irrigation system. It would be helpful to explain if the above figure of \$92.43 included the cost of this construction also.

The practicality of a farm family being able to come up with the initial investment for the necessary sprinkler system and farm production equipment should be discussed. Since the Carey Act appears to encourage long-term family homesteading and farm development of the project area, its potential success in achieving the project's purposes should be discussed in more detail and compared with agricultural development under the Desert Land Act.

According to the EIS, the net income of a farmer on a 320-acre farm is at or close to the poverty level. The general health environment that can be expected at that income level should be discussed.

Alternatives

In reviewing the main three alternatives to the proposed action, it appears more practical to implement the "Minimum Farm Development" alternative because it would have less environmental effects and takes pumping costs into consideration. Its implementation could also provide valuable information in the future for development of lands more than 500 feet elevation above the Snake River. Its health and environmental impacts could be documented, and appropriate mitigation measures could be incorporated into future agricultural development actions.

The assumptions imposed upon the subalternatives appear to be too restrictive. The Federal Land Policy and Management Act (FLPMA) lease alternative bases its rental rate on comparable leases in the area at \$22.50/acre. Without knowing more about the nature of the existing lease, the lands involved, and their status of development, we cannot determine if the proposed rental rate is justified in view of the incentives of the proposed action to improve agricultural production.

Similarly, the proposed market value of \$250/acre under the FLPMA sale alternative may not again be appropriate considering the undeveloped nature of the land and the capital expenditures by the farmer for irrigation improvements. Since a land tract of the size "necessary to support a family size farm" can be purchased under the FLPMA sale alternative, the tracts could be larger than the assumed 320-acre family farm unit. Would a larger size tract affect the feasibility of this alternative?



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333
TELEPHONE: (404) 633-3311

June 29, 1979

District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Sir:

We have reviewed the draft environmental impact statement (EIS) for the Boise District Agricultural Development in Elmore, Twin Falls, and Owyhee Counties in southwestern Idaho. We are responding on behalf of the Public Health Service.

The following comments are offered for your use in preparation of the final EIS.

Domestic Water Supply

The EIS should more carefully address the availability and expense of constructing potable water supplies for those application lands under the Carey Act. Certain areas within the undeveloped public land appear to be without any nearby source of potable water. Unless an adequate potable water source is or can be made economically available, applications under the Carey Act for construction of a residence should probably be denied or postponed until a potable water source seems likely.

Vectors

We have reviewed the EIS for potential vectorborne disease impacts. The extension of irrigation into undeveloped areas usually brings mosquito problems to those areas, and numerous examples can be seen in most of the western and midwestern States. In the past, unlevelled land was a primary mosquito source as were seepage areas and poorly maintained drains. Allowance has been made in recent years for leveling fields; however, with central pivot and other traveling sprinkler systems, this aspect has not been receiving the attention it had in the past. Excess water will still accumulate in low areas and will produce several species of vector mosquitoes as well as nuisance species. The lack of adequate drainage is still a major factor in mosquito breeding in irrigated agricultural areas today, and this should be recognized in the EIS.

Economics

It appears that the success of the proposed action will be dependent upon the formation of cooperative water irrigation projects with the Bureau of

Thank you for the opportunity of reviewing this document. We would appreciate receiving a copy of the final statement when it is issued.

Sincerely yours,

Frank S. Lisella
Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Bureau of State Services

Letter 31 Responses

1. In most instances potable water would probably be available in the quantity needed by Carey Act farm projects by deep well drilling in the farm area. It is possible that a potable water source may not be found in certain locations and this would be an important consideration in the feasibility of a project. Until test drilling was actually accomplished, it would be impossible to predict whether or not domestic water existed. Test drilling would be one of the first activities conducted by potential CA farmers - possibly prior to BLM land release approval.
2. The FES has been revised to reflect this concern (See Chapter 3 - under the Wildlife section).
3. Appendix 3-2, Farm Budgets, has been revised in the FES to reflect your comment.
4. It is outside the scope of the Environmental Statement to analyze each potential farmers financial capability. The financial condition of new farmers would be too variable. Financing is available, however, from institutional and private sources.

The "projects purpose" is principally agricultural expansion on public land. There are pros and cons associated with the development requirements under each authority. The requirements for DLA and CA are discussed in Chapter 1 and in the beginning of Chapter 8 for the FLPMA subalternatives.

5&6. Similar undeveloped land in and near the ES study area has been sold for about \$250 per acre. This appears to be the approximate fair market value of the public land that has potential for development. Rental rates assessed by the BLM would probably be about 10 percent of the market value of the land. Some comparable private leases in the area were about \$22.50/acre/year which is close to 10 percent of the lands fair market value.

With the current energy shortages, the most efficient use of these lands is that of livestock grazing. Under Alternative 3 of the EIS, it could be managed in a way that would hold the land in a status that would allow farming development at a later time.

With current environmental pressures against building additional power plants, as well as that of grazing reductions, we feel this is the only sensible alternative to this proposal.

The Idaho Cattlemen's Association is in favor of progress and production. However, under this development, many farmers and livestock producers stand to lose large profits. Therefore, we are adamantly opposed to this proposed development.

Thank you for your consideration of our comments.

Sincerely yours,

Mike Mogensen
Mike Mogensen
Executive Vice President

MM/ms

cc: Dept. of Water Resources



IDAHO CATTLEMEN'S ASSOCIATION

MIKE MOGENSEN, Executive Vice President

PHONE (208) 344-9482
2120 AIRPORT WAY
BOISE, IDAHO 83705

OFFICERS

PRESIDENT

J. W. Swan Rogerson

VICE PRESIDENTS

Howard Raney Weiser

Robert Swanson Pocatello

32

July 2, 1979

Bureau of Land Management
District Manager
230 Collins Road
Boise, ID 83702

Gentlemen,

Be it known that the Idaho Cattlemen's Association is strongly opposed to the proposed Boise BLM District Agricultural Development of farm lands under the Desert Land Act and Carey Act in the Glenns Ferry area. The following reasons express our views:

First, the proposed 111,015-acre development would remove this land from livestock grazing. This would cause reductions of up to 41,397 AUM's, and effect 127 livestock operators. Severe economic losses would be incurred by these producers due to this reduction.

Ruminant animals have grazed the lands of Idaho and the West for more than 100 years. They are the most energy-efficient means of producing meat and fiber from forages for human consumption. However, lately it seems popular to remove livestock from grazing lands.

Secondly, there is insufficient demand for agricultural products at this time, with surplus of potatoes and other commodities. We should leave these lands for future use. Management is needed now for livestock grazing.

Thirdly, our power supply is presently inadequate to supply pumps for irrigation. Idaho Power testified that additional power production would be necessary and power rates would be increased to all users as a result of this development.

Fourth, there is a need for these grazing lands now with the EIS's and possible grazing reductions elsewhere in Idaho. We may need these lands for increased grazing management rather than reductions.

Fifth, the BLM is opposed, for many of the above reasons. The BLM is willing to develop water and seedings in this area, but can't justify it until this issue is settled.

DATE: June 30, 1979
TO: Bureau of Land Management
FROM: Arthur J. Martin
SUBJECT: ENVIRONMENTAL IMPACT STATEMENT

33

As a Desert Land Entry applicant in "The Little Pilgrim Irrigation Company" project, I strongly support the proposed action of no less than 111,000 acres and favor the maximum development of 176,000 acres spread out over the next five years.

I believe that the State Water Board, if given the proper authority, would find numerous ways of saving unbelievable amounts of water by applying the proper applications throughout the Snake River system.

Off season "off stream" storage, whether it be high lift pumping or gravity flow, should be considered and utilized. High lift pumping in March, April and May would lessen the power load--the usage occurring between the heavy load of heating homes in the extreme cold winter months and the peak of irrigation loads in July and August. The heavy pumping of water out of the river would also happen in late winter and early spring and would not affect the minimum stream flow in July and August but very slightly. The basic amount of the water would be pumped in high river flow periods and would not interrupt power generation at that time of year.

The Oregon Trail and abounding corridor as set aside in the impact statement needs to be studied and weighed very carefully. Not only does it create a problem for several applicants in our project and our proposed reservoir site located in the upper Cassia gulch area, but due to the fact that particularly in the reservoir site, due to the fact that erosion caused by flash flooding and that a majority of the areas have also been grubbed of brush and seeded to grass by the Bureau of Land Management associated with the cattle grazing associations, little trace (or even markers to identify it) of the Oregon Trail can be found. Thus with the historical and scenic value of the trail destroyed, wouldn't the development of 15,000 acres of prime farm land in this area be much more valuable? A reservoir in this area, with a certain amount of water retained year round, would be of benefit to range stock, fish and wildlife. The Fish and Game Dept. says the reservoir would be a perfect nesting area for ducks, geese and other water fowl. The reservoir could also play an important part in the proposed Brumau Plateau project--at some time in the future it could be filled with gravity flow water.

I strongly feel that we should support the free enterprise system and use our water and our land wisely. PUT IT TO THE HIGHEST AND BEST USE FOR THE PEOPLE AND FOR THE STATE OF IDAHO and before California or some other state takes all of our excess water.

I disagree with the economy and employment figures as projected in the impact statement. For example, 8,000 acres of potatoes on a 16,000 acre project would employ in the neighborhood of 300 people year around just to pack and process the crop.

33

Having watched and traveled the Bell Rapids project almost continuously since its inception, this project besides turning sagebrush into beautiful crop lands ~~has contributed~~ has contributed a great deal more to the economy and present wealth of the Magic Valley than the figures in the impact statement indicates.

I do not believe that those of us interested in developing new farmland are uneducated dreamers and know nothing about the birds and bees when it comes to farming as our opposition would have you think. Most of the applicants for land development ARE farm oriented people and are just as qualified, or in some cases more so, as those that call themselves farmers. Many of the applicants are farmers or directly associated with the farming industry. One man, just retired from flying AIR FORCE I for several of our latest presidents, is going to farm on the Bruneau Plateau south of Glens Ferry.

Arthur J. Martin

Star Route
Melba, Idaho
July 1, 1979

Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

34

To comment on Desert Entry Patents for agricultural land, A covenant should be attached to require that the land remain in agriculture for a period of 50 years.

Some Desert Entries patented have been rip-offs for Right of ways and housing developments. If patented for agricultural purposes, it should remain so.

Residences should be limited, one to 80 acres.

Sincerely,

Adam H. Blackstock

Adam H. Blackstock

Letter 33 Responses

1. The figures in the Environmental Statement regarding secondary employment reflect the relationship between earnings and employment for 1974, the last year that data is available. Based on farm earnings, DYRAM (Dynamic Regional Analysis Model), the Bureau's computerized economic impact model, calculated both the secondary earnings and employment figures. The numbers are low because net farm income is low. The output from the model indicates that there will not be a sufficient amount of available income to hire a full complement of farm workers.

IDAHO WILDLIFE FEDERATION

Affiliated with the National Wildlife Federation

William R. Meiners, President
885 So. Locust Grove Rd.
Meridian, Idaho 83642
Telephone (208) 888-1254

Fred L. Page Jr., Vice President
Box 302
Hope, Idaho 83836
Telephone (208) 264-5559

William S. Platts, Sec.-Treasurer
1603 Sunrise Rim Rd.
Boise, Idaho 83705
Telephone (208) 342-2595

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July 2, 1979

Dean Bibles
District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Dean:

The "Draft Environmental Statement, Boise District Agricultural Development" is a comprehensive and impressive document. I commend you and your staff for a job well done. What impresses me is the refreshing, honest portrayal of data (where it is available) and the "worse-case" analysis (where data is fragmentary or non-existent) to provide a realistic, meaningful assessment of the situation. It is my hope that this procedure is now the procedure for other like BLM documents.

The Ada County Fish and Game League, the Idaho Wildlife Federation have long questioned the applicability and economic feasibility of continued agricultural development under the Desert Land and Carey Acts in Idaho in today's world. While these acts served well the need and desires of people at the time of their enactment, they are no longer viable instruments nor do they serve the public's interest. The assessment portrayed in the subject document attests this fact. It is not in the public's interest to exploit, even destroy, the public land and its resources to provide short-term economic benefit for a few individuals while saddling the general public with the costs (both monetary and foregone options applicable to other public land use(s)) of such development. The Idaho Wildlife Federation, therefore, takes exception to the Proposed Action and requests that Alternative 3, "No Farm Development," becomes the Bureau's position and trust in issue of the Final Environmental Statement.

It is also well to note, given the mandate of the Federal Land Policy and Management Act, Section 102(1), that no National interest will

be served by disposal of public lands under the Desert Land and Carey Acts. Indeed, it would be counter-productive in view of energy demands, crop subsidy, and social/economic impact. Further, given the recent Ninth Circuit Court of Appeal Decision it would seem the Bureau of Land Management should move immediately to cancel all pending Desert Land Applications and hold what, if any, lands that might meet the criteria for disposal in the National interest as necessary to accommodate, in part, Carey Act applications. To do otherwise would appear a violation of the Federal Land Policy and Management Act.

Thank you for the opportunity of comment, may we move to management of our remaining finite public land resources in a manner which assures their stability and viability while keeping future options for future generations. Alternative 3 best meets this test at this time.

Sincerely,

William R. Meiners
William R. Meiners
President

- cc: Fred Page
- Phil Schneider
- Don Aldrich
- Governor John Evans
- Senator Frank Church
- Russ Heughins
- Vernon E. Smith
- Doyle Smout
- Bruce Bowler
- Patrick A. Parenteau
- Johanna Wald

Mr. Dean Bibles,
District Manager,
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Mr. Bibles:

Enclosed for your consideration are our comments of the Draft Environmental Statement, Boise District proposed agricultural development.

Current planning to develop these proposed agricultural developments per State Department of Water and specific development plans for the Little Pilgrim Project is for off season storage with pumping during low electric demand periods of Idaho Power and also, when the Snake River is at its maximum flow. This E.I.S. failed to consider this premise for development even though it was mentioned briefly. Because of these facts, the power cost projections are erroneous along with the effects of water quality and wildlife (fish & game).

Per flow records on the Snake River, there is excess water during the winter and spring months which is not being used for irrigation nor hydroelectric power generation. This flow is in excess of maximum turbine capabilities of Idaho Power on existing hydroelectric sites. It is our belief, as well as, the Idaho State Water Board, that if Idaho does not use our excess water to beneficial use, the Federal Government will try to export Idaho water to other states such as California.

By using excess Snake River flows during the winter and spring months along with power during non peak months from Idaho Power, the increased power costs to present Idaho Power customers would be considerable less than projected in the E.I.S. draft.

Per E.I.S. economic approach, we strongly disagree with the projected yields. Yields table 1-4 and 2-2 indicated yields substantially lower than what is currently being produced on comparable projects such as Bell Rapids, Grindstone, and Saylor Creek. Per Amalgamated Sugar, the Bell Rapids Project has averaged 25 ton/ac. for sugar beets. Field men from the major potato processors have indicated potato yields in excess of 400 cwt./acre. These are a few of the documented examples of the falacies in the E.I.S. yields.

July 2, 1979

Attention: B.L.M.

Reference: Environmental Impact Statement.

In reading and studying your statement it was clear to me that the study was very biased and some parts not very well researched. and I felt in direct opposituin to Agicultral Development.

- 1-Idaho's natural resources are her land and water and I think those interested in her should plan a development and use or these. She still has plenty of desert land and forest land that can be protected and has no water available to develope.
- 1- In the U.S. currently 3 million acres per Year are being Urbanized. And lost to Agriculture. How long before we begin to feel the shortages of food other nations are now feeling.
- 2- Some of our food products will surely find there way into energy sources.

- 2-Your figures and charts on :
 - 1-Costs of Production
 - 2-Yields of farm products
 - 3- Net incomes

border on ridiculous. Being a farmer myself I know what these figures are and feel the statement was gravly misrepresented on these facts. The way they are put together with the costs to high and the yields too low really throws the net per acre out of proportion.

3-The Little Pilgrim Irrigation Co. I feel is in a class by itself and shouldbe considered such. here we are planning to use the Bell's Rapid pumping plant in the off season and store our water in a resevor for later use.

Thand You

Stuart T. Lund

Mr. Dean Bibles
July 2, 1979
Page 2.

Per E.I.S. Southern Idaho has one of the largest blocks of undeveloped potentially irrigable lands left in the United States. The U.S.D.A. estimates there is approximately three million acres per year going out of agricultural production. For this reason, we are definitely in favor of maximum development in the E.I.S. study area. The United States will find itself agriculturally in the same shape as we are with oil if we neglect to plan for the future.

Per alternative "4" considered lease farm development is one of the strongest forms of socialism we have seen proposed by the Federal Government. If this alternative is used, it would be a big set back to the production capabilities of American agriculture. If the Federal Government would like to have food shortages as the Soviet Union has under a similar type agricultural make-up, this proposal should be accepted. If the Federal Government has the right to draft young men to fight communism around the world, it appears these young men should be fighting communism in Washington, D.C. with this type of proposed governmental ownership and control coming from Washington.

The major concern of this E.I.S. and Department of Interior is that these projects are economically unfeasible; why doesn't the Federal Government allow private enterprise to make these economic decisions. Due to the years experience we have had as mortgage lenders for a major insurance company on D.L.E. projects (Grindstone Butte and Bell Rapids) our experience has been more than satisfactory as to repayment abilities and to profitability of these present developments. The draft E.I.S. uses three of the lowest average prices received for farm commodities in recent history when adjusted for inflation. If these developments are economically unfeasible at projected costs, long term mortgage money is not going to be available for private development. Private enterprise is more capable of making these economic decisions than the Department of Interior.

We thank you for the opportunity to allow us the input in the revision of the final draft of the E.I.S. We feel confident when all factors are fairly considered, there is no doubt the conclusion will be for private development of these desert lands.

Sincerely yours,

Jack C. McCall
Jack C. McCall

Greg Ruddell
Greg Ruddell

Mr. Dean Bibles
July 2, 1979
Page 3.

37

cc: Honorable Senator Frank Church
Honorable Senator James McClure
Honorable Congressman George Hansen
Honorable Congressman Steve Symms
Honorable Cecil Andrus, Secretary of Interior
Honorable Governor John Evans

3. Table 1-4 has been revised to increase the yield on alfalfa to 5.5 T/acre, which more accurately reflects alfalfa production in the ES study area. The other crop yields remain the same in the FES and are based on yield information supplied by the Statistical Reporting Service and County Extension Agents. The yields are based on the last five year average for the counties in the ES area. Actually all yields are above the estimates supplied by these sources. There may be some instances where crop yields were higher at certain locations but the yields in Table 1-4 are considered to be slightly above average.

Yields for Table 2-2 is potential production for the different crops and soil types under good soil management practices. This table reflects the best crop production that can be achieved on the different soil classes as compared to the averages in Table 1-4.

Letter 37 Responses

1. In the conception stage of this ES, there was no off-site storage proposal for the Little Pilgrim Project which utilized river pumps of the Bell Rapids Project. This plan is unique to the Little Pilgrim Project. Idaho Department of Water Resources is going to do a feasibility study over the next 2 1/2 years on the Bruneau Plateau Development Project which could be incorporated into your proposal. However, this is strictly in the concept stage. The purpose of this ES, (as stated in Chapter 1), is not to analyze specific projects, but to determine impacts from high-lift pumping during the normal irrigation season, of which the great majority of DIA and CA application propose to do in the ES study area. There have been a number of comments on the FES concerning irrigation development by off-stream storage. This concept is described in general terms in Chapter 8 of the FES. It is too early to do a comprehensive analysis of any off-stream storage projects because they are still in the planning and feasibility stages.

2. The electricity demand resulting from initial pump lifts could be shifted to the non-peak load months of IPC by pumping into offstream storage. Hydroelectric resources would also be greater during non-summer months.

Pumping from storage reservoirs for irrigation of crops would still occur during the summer and as a result this portion of the load could not be shifted to non-peak months.

Hydroelectric losses would still occur as a result of diversions into offstream storage. In a median water year, streamflows in all months are less than the hydraulic capacity of the major IPC dams. Offstream storage could also significantly affect the operation of Brownlee Reservoir, especially during years of very low streamflow such as 1977.

Diversions from the Snake River into offstream storage would result in hydroelectric losses at Federal Snake/Columbia River dams. Any Pacific Northwest hydroelectric losses in the winter would coincide with Pacific Northwest seasonal peak load.

Based on existing information, it cannot be concluded that cost impacts of offstream storage projects to the South Idaho economy would be less than the electricity cost impacts estimated in the ES. Comparisons of offstream storage cost impacts with electricity cost impacts cannot be made without information on the costs of the offstream storage projects and the distribution of those costs between new irrigators and other sectors of the economy.

RAY PERSHALL
Route 1, Box 125
Marsing, Idaho 83639

July 2, 1979

38

Mr. D. Dean Bibles
District Manager
U. S. Bureau of Land Management
Boise District Office
230 Collins Road
Boise, Idaho 83702

Dear Mr. Bibles:

I am a livestock operator on public lands within the Boise District. I write this letter to you in order to give you my comments on the "Boise District Agricultural Development Draft Environmental Statement for Southwest Idaho".

The Draft ES Statement indicates that a power supply is not presently available for the farms in the proposed action. It is reported that as of the date of this letter some power users within the Idaho Power Company service area are being shut down due to the lack of power. The Draft ES Statement also indicates that if such energy supplies were to become available for the proposed farms, it appears that those energy supplies would only become available at a cost to all consumers in the power service area, many of which would not receive any direct or indirect benefits from the planned development.

The Draft ES Statement also indicates an unreliable source of irrigation water for the proposed farms due to uncertainty of minimum stream flow requirements, undetermined water uses in the future upstream from the areas involved in the proposed action, and inadequate groundwater sources that can economically be pumped. The apparent deficiencies in power and available irrigation waters indicate that the proposed action is an uneconomic venture at this time.

The Draft ES Statement indicates that livestock grazing use eliminated by the proposed action would be an average of approximately 10% reduction for all operators for AUMs included in the proposed action and that an average 27% reduction could be sustained by all operators on AUMs within the ES area due to total impacts resulting from the reduction in grazing use, scattered farm locations, and inadvertent interference of livestock operations from adjacent farm activity. The losses in grazing use by livestock operators involved in the ES area may appear to be insignificant on the surface. The grazing use that will be lost by the livestock operators is a significant and integral part of a continuing year-round livestock operation. The loss of this integral part of the existing livestock operation will cause the remaining portion of the operation to be unbalanced and for the most part inoperable from a seasonal use standpoint.

The loss of grazing use by the livestock operator can not be replaced without cost. The loss of grazing use will then either be sustained by the present livestock operator or the loss will be sustained by another livestock operator from which the present operator acquires grazing use to replace that which is lost. In the final analysis, the loss due to the proposed action is a loss to the livestock industry in general and can not be replaced.

The livestock industry not only produces food and fiber, but also produces other jobs, services, and by-products in the process of delivering the finished product to the consumer.

The apparent unreliable and unfeasible farms in the proposed action together with the economic losses sustained by the local community, as well as the extensive losses sustained by the livestock industry, indicate that the proposed action is unfeasible and uneconomical and not in the public interest.

It is my recommendation that the proposed action should not be adopted and that Alternative No. 3, "Allow no farm development" should be adopted until such time as further farm development can be developed with reliable irrigation water sources and power sources without interference with other land uses.

Very truly yours,
Ray Pershall
Ray Pershall

a yearly basis. Unlike fall use, there is no viable replacement for spring use, once the land is taken for agricultural development. Thus, a reduction of grazing use in the Saylor Creek Allotment becomes in reality a reduction in the operations of the users.

Another factor to be considered here is the present draft of the Shoshones District's Grazing EIS for the Bennett Hills area. This draft, should its proposed action be implemented, would cut livestock use by an average of thirty-five percent. Many of the sheepmen who have use in the Saylor Creek Allotment also have use in the Bennett Hills Area. Ironically, it has been suggested that any loss of use that the users sustain under the Grazing EIS be made up by use of their nonuse AUMs in the Boise District. Most nonuse AUMs in the Saylor Creek Allotment have already been converted to cattle use. Thus few, if any, nonuse AUMs are available.

Further, the loss of spring use in the Saylor Creek Allotment and the resulting reduction in sheep numbers would also have an effect on Forest Service lands. A lot of Forest Service reserve would have to go into nonuse due to the lack of livestock to graze it during the summer.

In light of the above, it is my conclusion that should the proposal be implemented, it would cripple an industry that has made successful use of the land involved; an industry that has, in partnership with the ELM, helped to plant vast acreages of crested wheat grass and developed other improvements upon the land; an industry that has had few if any of the adverse impacts that agricultural development will have, nor will be need to be subsidized by the power rate users. Thus, I would recommend that the Bureau adopt alternative 3 (no development) of the draft.

John Faulkner
John Faulkner
President, Gooding Sheep Association

DATE: 29 June 1979

COMMENT: At present, 26 bands of sheep use the Saylor Creek Allotment during the spring, and 6 bands use it in the fall. These are as follows:

Spring Use	#Bands	Fall Use	#Bands
Astorquia	2	Astorquia	1
Arkoosh	4	Brailsford	2
Brailsford	3	Faulkner	3
Faulkner	7	Noh	1
Jones	2	Wilson	2
Guerry	1		
Patterson	1		
Sliman	2		
Wilson	4		
	26		9

Should the proposed action be implemented, each of these operators would face a 23-29% cut. This would be an overall reduction of approximately 6.5 bands during the spring and 2.25 during the fall.

Use of the Saylor Creek Allotment, by sheep, happens in the early spring and late fall. Spring use begins usually sometime around the 20th of March. This early spring use is important to the users for two reasons. First, it allows the user to get his livestock out on grass, and off of hay. Hay being a major expense in any livestock operation. The earlier he is able to put his animals on spring pasture, the better his profit picture will be. Second, sheep cannot or will not utilize the crested wheat grass seedings once they become old and tough. Cattle, on the otherhand, will eat crested wheat grass once it is mature. Sheep must have the young, tender shoots that the grass produces in the early spring.

Should the proposed action be implemented and the cuts in livestock use made, it would result in a reduction of approximately one out of every four bands of sheep which now use the Saylor Creek Allotment. This reduction would primarily be caused by the loss of spring use. Most of the sheep operators in the allotment are there for the early spring and then move north to higher, wetter ground, mostly owned by the BLM and Forest Service, as the summer progresses. Fall use occurs in the late fall, beginning in the latter part of October or the early part of November. Fall use might be replaced by the purchase of pasture from area farmers. It is questionable weather or not this replacement pasture would be available on

COMMENT: It is my feeling that any attempt to implement the action proposed by the present draft of the Boise District Agricultural Environmental Statement would be in conflict with the Idaho Ground Water Act (I.C. 42-226 et seq) and the present Idaho case law dealing with "mining" of a groundwater aquifer. In Chapter 3 of the draft, which deals with the environmental impact of the proposed action, on page 3-11 it states:

"Groundwater withdrawals (27,823 acre-feet per year) are more difficult to assess than surface water because no reliable groundwater supply data are available. U.S. Geological Survey investigations show the likelihood that conflict between groundwater users in the Bruneau area currently exist. That is, in some instances one well is causing a lowering of the water table feeding a neighboring well. With this situation in mind, it seems reasonable to predict that in such areas new wells will lower water tables further. This creates additional costs for the farmer. Pumps may need to be lowered and/or wells deepened. Water must then be lifted higher at more expense. Flows may be diminished.

There may, however, be areas where sufficient groundwater is available and no user conflict would occur. It is acknowledged that not enough is known about the groundwater supply situation to predict impacts with complete accuracy." (emphasis mine)

In Chapter 7 of the draft, dealing with irreversible and irretrievable commitment of resources, at page 7-1 it states:

"Groundwater supplies would gradually diminish between Bruneau and Murphy as 27,827 acre feet were pumped each year for irrigation in this part of the ES area."

Article 5, Section 7 of Idaho's Constitution calls for the optimum development of Idaho's ground water resources. This has been taken to mean "full economic development", Baker v. Ore Ida Foods Inc. 95 Idaho 575, 513 P2d 627 (1973). A policy encoded in Section 42-226 of the Idaho Code;

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"It is hereby declared that the traditional policy of the State of Idaho, requiring the water resources of this state to be devoted to beneficial use in reasonable amounts through appropriation, is affirmed with respect to the groundwater resources of this state. . . and, while the doctrine of "first in time is first in right" is recognized, a reasonable exercise of this right shall not block full economic development of under ground water resources, but early appropriators of underground water resources, but early appropriators of underground water shall be protected in the maintenance of reasonable water pumping levels as may be established by the director of the Department of Water Resources as herein provided. All groundwaters in this state are declared to be the property of the state, whose duty it shall be to supervise their appropriation and allotment to those diverting the same for beneficial use."

Section 42-226 has been interpreted to mean that there shall be no mining of an aquifer, Baker (supra); Brigs v. Golden Valley Land and Cattle Co, 97 Idaho 427, 546 P2d 382 (1976). An aquifer is being "mined" when the total annual withdrawal from an aquifer is in excess of the average annual recharge of the aquifer.

To allow for full economic development, Section 42-226 requires an appropriator to lower his well until he has reached the pumping level set by the Director of the Department of Water resources. It is my understanding that these levels would be set so that the annual withdrawal from an aquifer would equal the annual recharge. I am not aware that any such pumping levels have been set for the areas covered by the draft EIS. Once a pumping level is set however, an appropriator would be protected. He would not need to drill deeper than the set level and as I understand it, once the groundwater table has reached the set pumping level no other appropriators would be allowed water rights in the aquifer because to do so would be to mine the same in violation of Section 42-226.

Referring back to the above quotes from pages 3-11 and 7-1 of the draft, it would seem that an in depth investigation should be conducted as to the effect of the proposed action would have on ground water levels before any rational decision could be reached as to the implementation of the action or any of the proposed alternatives.

It would be folly for the BLM to allow development as outlined in the EIS and then to discover that such development is made impossible by the lack of water available for use due to legal reasons. A lack of water available for use would seem probable in view of the present conflict between water users in the Bruneau area. Idaho Code Section 42-237 a (g) sets out the course of action to be followed by the Department of Water Resources as follows:

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"Water in a well shall not be deemed available to fill a water right therein if withdrawal therefrom of the amount called for by such right would affect, contrary to the declared policy of this act, the present or future use of any prior surface or ground water right or result in the withdrawing the ground water supply at a rate beyond the reasonable anticipated average rate of future recharge."

In the light of the foregoing, I therefore propose that the Bureau follow alternative 3 of the draft which provides that no farm development be allowed. This alternative of no action should be followed until such time as reasonable pumping levels for the area are established by the state, which would allow for the making of an informed decision as to the amount of agricultural development within the EIS area.

Date: _____

BOISE DISTRICT AGRICULTURAL DEVELOPMENT DRAFT ENVIRONMENTAL STATEMENT

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COMMENT: I would like to address a few comments to the relationship between the Boise District Agricultural Development EIS and the Grazing EIS which is to be completed in the early 1980s (1-24 & 2-95). Under the proposed action development of the 111,015 acres, "would take place over a five-year period, from 1980 through 1984, at an average of about 22,000 acres per year." (1-7) The implementation of the proposed action over this five year period would result in, "the elimination of livestock grazing on approximately 146,380 acres of public land."(3-50) This breaks down to be a loss of 14,975 AUMs, with a resulting economic impact, with varying degrees of severity, on 127 individual livestock operators. (3-53 & 3-54)

I believe that the allowance of the implementation of the proposed action within the five year time frame with the resulting loss in livestock AUMs would be an illegal action and contrary to the purpose and spirit of the entire environmental statement process. Section 102(a)(1) of the Federal Land Policy and Management Act of 1976 (FLPMA) states as follows:

"The Congress declares that it is the policy of the United States that . . . the public lands be retained in Federal ownership, unless as a result of the land use planning procedure provided for in this Act, it is determined that disposal of a particular parcel will serve the national interest;" (emphasis mine)

Section 202(a) of the Act states:

"The Secretary shall . . . develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of public lands. Lands use plans shall be developed for public lands regardless of whether such lands previously have been classified, withdrawn, set aside, or otherwise designated for one or more uses." (emphasis mine)

When both of these sections are read together, it would seem a logical and reasonable conclusion that to allow the development of the 111,015 acres as set forth in the proposed action without first having concluded the drafting of the Grazing EIS and the various resources inventories (2-96 & 2-96) would be contrary to law and the spirit of the FLPMA.

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Bureau of Land Management
Boise District

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In light of the above, it is recommended that Alternative 3, i.e. no farm development, be the course of action followed by the Bureau, at least, until such time as the Grazing EIS is completed and its finding can be taken into consideration in any decision as to how much development will be allowed, if any.

Further, since the Agricultural Development EIS deals with the permanent disposal of the land involved, I would suggest that the final draft of the Agricultural Development EIS or the Grazing EIS, which is to be prepared, consider the possible disposal of the land by the Government to the present livestock users, as an alternative to any proposed action. This disposal could be done under the PLMPA (Section 203) or under new legislation, should such be deemed necessary. Such new legislation might be brought into being under the procedures set out in 42 USCS 4342 (5) & 4344 (National Environmental Policy Act).

The above course of action has one thing to recommend it and that is the fact that the disposal of these lands to the various livestock users would result in few, if any, of the unavoidable adverse impacts outlined in Chapter 5 of the draft or the irreversible and irretrievable commitment of resources outlined in Chapter 7. Also, there are economic arguments to recommend such a course of action. These arguments, however, would probably require the full analysis of an EIS to determine their persuasiveness.

Michael J. Bassel

Date: 4/27/79



League of Women Voters of Idaho

420 South 12th
Pocatello, Idaho, 83201
July 2, 1979

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District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho, 83702

Dear Sir:

Enclosed are the League of Women Voters of Idaho comments on the Draft Environmental Statement on Agricultural Development for Southwest Idaho.

The comments were written by:
Katrina Berman, Water Chairman, 1304 South Main, Moscow, 83843
Sally Gibson, Energy Chairman, 1507 East Lander, Pocatello, 83201
Dorothy Mandiloff, Land Use Chairman, 850 Safstrom Drive, Idaho Falls, 83401

Thank you for inviting us to review and comment on this environmental statement.

Sincerely,
Sallee C. Gasser
Sallee Gasser
President

Letter 41 Responses

- 1. This is not judged to be a viable alternative.



League of Women Voters of Idaho

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July 2, 1979

Comment on Draft Environmental Statement
Agricultural Development for Southwest Idaho
U.S. Bureau of Land Management, Boise District

The proposed action evaluated for environmental impacts in this draft environmental statement by the Boise District Office of the BLM is to allow conversion of 111,015 acres of public land within the BLM Boise District to irrigated farmland from 1980 through 1984, under the Desert Land and Carey Acts, with irrigation water provided primarily by high-lift irrigation from the Snake River. This development would be part of the 987,000 acres (790,000 in south Idaho) of new irrigated agricultural acreage projected by the Idaho State Water Plan.

Our comments on the ES are based on the following League of Women Voters positions:

- Land Use decisions should be based on social, environmental and economic factors. Those decisions should assure consideration of human needs as well as the inherent characteristics and carrying capacity of the land. The appropriate level of government should identify and regulate areas of critical concern such as fragile or historic areas.
- Energy policies should bring about a significant and progressive reduction in U.S. energy growth rate and should give priority to conservation and the use of renewable resources.
- Water policies should improve water quality and include management of water resources to meet regional needs and the national interest.

We do not feel that the proposed development is in the interests of the people of Idaho or the United States. Although the League did support the State Water Plan, we did question sections of the Plan dealing with the development of new agricultural land.

A starting point in evaluating a proposed public action is assessment in dollar terms of economic gains and losses to society. The ES presents the data needed for such an assessment, but not in a form for easy comparison by the public.

Economic gain to society from the proposed action would be the value of added agricultural production, above the inputs and other costs necessary to achieve the production. The ES presents estimates of "net farm income" on several assumptions as to crop prices and electric energy costs. These estimates demonstrate that net gain would be greatly affected by changes in these two variables.

The ES calculates a figure for "net farm income" for a typical proposed farm by subtracting from the value of the crops the operating costs, including both labor costs and energy costs, and a figure for "return to land". Both the "return to land" and most of the labor cost (if the farmer operates his own farm, as Carey Act residence requirements seem to anticipate) accrue to the farmer. Comparison of "net farm income" as calculated with the "poverty level" income for farm families, as is done in the ES, is therefore not appropriate in assessing viability of the farm. (With the estimates of probable losses in the ES calculations, no entryman demand would be expected, and development would not take place.)

A net farm income figure is appropriate, however, in calculating economic gain from development. Labor costs (based in the ES on costs of contract operations) are properly deducted from crop value even if representing the farmer's own labor, since they represent the foregone value of the farmer's work in alternative employment. Cost of land used should similarly represent the value of foregone alternative use (rather than an arbitrary figure of percent of operating costs as in the ES). Foregone alternative use for the land here is as grazing land. Cost of land for irrigated crop production therefore is the value of lost grazing, given in the ES as \$414,000 per year. (This is a maximum "worst case" estimate, but the difference between this and the value of grazing acreage actually converted to irrigation is not enough to affect results.) Energy costs paid by farmers should be valued at the most probable price calculated in the ES's discussion of energy, roughly 20 mills per KWH.

A rough estimate of net farm income using these figures is presented in a table below, in totals for the total acreage. Crop prices used are normalized 1977 prices (average of 5 years ending in 1977) which seem the most appropriate probable estimate. The figures show that costs of production on the new irrigated acreage would be larger than the value of the crops produced. This would be true even at current prices for energy. Use of 1977 actual crop prices would increase the deficit shown, and only 1976 normalized prices (of the options given) produce a positive showing. Future surplus of production value over production cost would depend on crop prices rising faster than prices of energy (currently 14% of total costs) and other inputs, which does not seem likely. (It might be noted that the ES foresees a possible 34% drop in prices of potatoes -- which account for 45% of anticipated farm revenues -- over 5 years as a result of the increased production; other crop prices might be similarly affected.)

Secondary economic impacts from the new farming operations at this level of profitability would be zero or negative (p. 3-63).

Large additional economic costs to society must be considered, however, in addition to costs at the farms. These would result from the proposed development because of the irrigation's water and energy needs. The proposed irrigation at relatively large distance and height from the river, would require large amounts of energy for pumping irrigation water. (Electricity use for irrigation would increase 26% for only a 6 1/2% increase in irrigated acreage.) At the same time, the proposed irrigation would reduce hydroelectric energy production by reducing the water flowing over power producing dams. The necessary additional and replacement electricity could not be supplied by Idaho Power Company from existing resources, but only from

purchases of electricity or building or sharing in building added capacity, at much higher cost than costs of electricity currently being produced. Costs are particularly high because of concentration of the electricity demand in 7, and particularly in 3, months, requiring more capacity yielding surplus electricity in other months.

Only a portion of the electricity costs of the new development would be paid by the new irrigators themselves. Electric utility pricing policies average high-cost electricity in with low-cost electricity to determine system prices to all users, so that the major part of the electricity cost of the new irrigation would be paid by other customers of Idaho Power Company and not by the new irrigators themselves. (If the rate system were changed so that new irrigators paid the full costs, farming would obviously be economically unfeasible.)

The full electric energy cost of the new irrigation must be included in weighing the net economic gain to society from the proposed action. Under various assumptions as to IPC electricity procurement methods, total cost to the IPC system would be \$12 million to \$66 million, of which the new irrigators would pay \$6 million to \$8 million (table 3-21), leaving \$6 to \$47 million to be paid by other IPC customers.* Costs under the "most likely" procurement scenarios are shown in the table below. Additional costs to society for replacing lost hydroelectric power production at dams on the remainder of the Snake-Columbia system would add another \$5 million to costs of the proposed action, unless offset by IPC sales of surplus off-season power from new generating capacity; the \$5 million should be added to the low-cost IPC procurement options. It should be noted that these figures and the table are for an average year; covering drought-year needs would greatly increase the costs.

The resulting increase in electricity price would accumulate and increase as these costs are passed through the economy, resulting in increased inflation.

Calculations of water use and energy cost in the ES are carefully done, with reasonable and conservative assumptions. Assumptions tend on the whole toward underestimation of water and energy needs. For example, diversion of water is assumed equal to crop consumptive use, with no water loss by evaporation or otherwise; maximum efficiency is assumed for pumping; lift and distance from the river are calculated at the closest point in each land parcel; hydropower loss at Lower Salmon dam is not included, although 43% of the land to be irrigated is above Lower Salmon. Although the assumption of closed pipe delivery increases energy needs for pumping, it minimizes water need. Under the stress peak summer demand conditions involved, the assumption that all diverted water would otherwise have been used for electricity generation at all downstream dams is reasonable. Cost estimates for new power production are conservative. The lowest cost of the "most likely" scenarios for IPC procurement of the needed electricity includes an assumption that exact shares needed of new plant production can be purchased, for a minimal cost result. Energy costs might be reduced by a Bruneau Plateau canal project, purchases from a "water bank", or use of solar, alcohol, or other non-electric power sources, but at this point these are only hypothetical possibilities, and evaluation of a present proposal must be based on present probabilities.

* after allowance for revenue from off-season sales

The League questions the justification of action by a public agency which would result in large economic costs and no economic benefit (see table below), unless there are expectations of offsetting social benefits in areas not susceptible to monetary measurement.

The ES also identifies some expected costs and benefits from the proposed action that cannot be easily quantified in dollar terms. The development would reduce instream water flows below Idaho Fish and Game Department recommendations in low-flow years, with adverse effects on fish and recreation. Water, an increasingly scarce and valuable resource, would be irretrievably committed once water rights were issued. The low-cost hydropower that would be lost will become increasingly valuable in the future. Water tables would also be lowered from groundwater irrigation, entailing added expenses for some current well users.

Lowered air quality would exceed particulate standards in spring months. Some soil erosion would occur. Soil mining is foreseen which would reduce soil productivity. Additional adverse impacts on air, water and land resources would result from new facilities to increase electricity generation. These anticipated impacts are similar to those which led to widespread public opposition to the proposed Pioneer power plant.

If more land is put into agricultural production a higher consumption of chemical energy would result through the use of gasoline and diesel fuel. More farm machinery would be required and farm to market transportation would increase. Increased indirect energy consumption represented by fertilizers, pesticides and herbicides would also result. Although this increase in chemical energy consumption would be small compared to the total Idaho consumption, these energy forms are non-renewable.

Social, environmental and economic factors are covered in the ES but there is inadequate information as to how fragile and historic areas could be protected. The ES gives the criteria of the Secretary of Interior regarding choice of places to be included in the National Register of Historic Places. Several areas in the ES clearly meet the criteria of making "a significant contribution to broad patterns of our history" or "that have yielded information important in prehistory or history." Those places which should be preserved are the Birds of Prey area, the Oregon Trail, the Kelton Road, the Hagerman Fossil Beds and the other prehistoric sites. No development should be allowed in these areas and care should be taken to provide adequate public access.

Public opinion in Idaho indicates a strong preference for maintaining Idaho as an agricultural state. The State Water Plan has as a major objective maintaining Idaho's relative share of national agricultural production. The Plan, however, did not include any estimate of energy costs of proposed agricultural development. This serious omission results in an unrealistic picture of economic results from agricultural development. The review of the State Water Plan scheduled for 1980 should include a thorough examination of energy costs of the projected irrigation development.

The proposed action follows the pattern of past Idaho agricultural growth. However, that pattern was based on fertile land near plentiful water with ample

cheap electricity for irrigation power when pumping was necessary. Those conditions no longer apply. The analysis in the ES suggests that future agricultural growth in Idaho will have to follow a different pattern.

We seriously doubt whether the citizens' desire for agricultural development is sufficiently strong to support multi-million dollar annual subsidies to the prospective new irrigators for electric power. The effect of increased electricity costs on existing Idaho Power Company customers would be extreme (up to \$90 per year for a typical residential customer). This impact on a low-income or fixed-income household would be severe. The effect of higher electricity costs (up to \$800 per year increase for typical customer) on existing irrigators is particularly important. The increase in energy costs plus the competition of increased agricultural production have the potential of putting existing pump-irrigated land out of production. It is possible that there would be no net gain in the agricultural production of this region in the long run. The ES foresees a possible depression of the local economy, with no output increase, and higher costs for all.

Included in the ES are several maps showing location of over 20 parcels of state endowment lands, but the ES contains no text concerning plans for these lands. The LWVI has been interested in state lands for the past ten years and our position has advocated exchange of isolated tracts of land with the federal government. If land exchange does not take place and the proposed action is allowed, state lands would be further isolated and therefore more difficult to use and administer. The final ES should discuss the available options for state lands if development occurs.

There should be coordination with county land use plans. The ES states that counties have not established implementing ordinances and states that the BLM has expertise which could help counties. The Local Planning Act of 1975 made all actions of state agencies subject to local comprehensive plans. While the BLM is not subject to this law, coordination of planning effort would be beneficial to both the BLM and the counties. The best time to use the BLM's expertise would be before development commences. It is not clear from the ES how much consultation has taken place between the counties and the BLM. Such consultation is especially important in the area of public facilities needed and should take place at the earliest possible date.

The ES appears to operate on the premise that the three counties involved have zoned land for agriculture based on the land's ability to produce crops. It is, however, common practice in Idaho counties to zone land which is not specifically used for anything else as "agricultural" land. In such cases, this designation has nothing to do with the capacity of the lands to produce. The BLM needs to ascertain whether land in the ES area is actually zoned on the basis of its possible productivity or whether it is designated agricultural for lack of a better name.

Comments on Alternatives

Minimum Development

The ES analyzes a minimum development alternative which would limit irrigation development to land less than 500 feet above the river, for a total of 38,120 acres.

This alternative would develop 26% of the 111,015 acres with only 16% as much electricity consumption.

The new farming operations under this option could be expected, according to the ES analysis, to yield a positive net value even at 1977 normalized prices (though not at 1977 actual prices). This is because of lower energy requirements resulting in smaller increases in electricity prices and lower costs per farm for pumping systems because of the reduction in lift height and distance from the river. The positive farm income surplus (at 1977 normalized prices) would generate additional positive secondary economic effects according to the BLM's model. Estimated on the same basis as done above for the 111,015 acre proposal, total net direct and indirect economic gains from farming would be around \$3 million. (Negative indirect economic effects from the higher electricity bills to other customers have not been estimated, however.)

The irrigation pumping load under this option would result in a cost for the Idaho Power Company system, by likely IPC procurement methods, of \$4 million to \$11 million, of which the new irrigators would pay \$1 million, leaving the rest to be paid by other IPC customers (with \$1 million of the \$11 million recouped from outside sales). These figures and farm income figure totals are shown in the accompanying table. The ES estimates that residential electric bills would rise by up to \$17 per year, and the average irrigator's bill by \$49 to \$162.

The minimum development alternative comes closer to showing positive net economic gains in pursuit of maintaining agriculture's position in Idaho, with considerably smaller adverse effects. However, the new farm development would still receive -- and be dependent on -- a continuing annual subsidy from existing irrigators and other electricity customers of Idaho Power Company. The League questions the justification of a public agency promoting the private economic gain of one group at the expense of other groups in the society. No overriding public purpose of the proposed development, even on the minimum scale, has been demonstrated.

Lease of Lands

Many problems could occur under this alternative. State lands which are leased for agriculture require an enormous amount of administration. Who would determine "fair market value" and who would develop water rights? If each farm is expected to lose money, the BLM could quickly find itself with unpaid rentals.

Sale of Lands

This method would also result in farms which are losing money. Another problem also exists. The ES says that lands sold would have covenants to permanently preserve lands for agriculture. In many years of land use experience, we have never heard of a situation where this really works. It sounds good on paper, but covenants are not provided for in state planning laws and are not recorded or honored by local governments. If this alternative is seriously considered, more explanation is needed.

The loss of cultural resources, wildlife habitat, scenery, recreation and grazing land is too big a cost for too little gain. The League believes that development of farm land in this area may be needed in the future, but it is not worth the cost now.

League of Women Voters of Idaho

Economic Benefit and Cost of Proposed Action: Totals, \$ Million

Economic Benefit

Gross Revenue from Crops: 347 farms @ \$141,126 (p.A-51) at 1977 normalized prices	49
Less: Production cost (incl. labor, interest, pumping system cost (p. A-55) excl. electricity for pumping)	43
Less: Cost of land (value of lost grazing) (p. 3-61)	0.4
Less: Electric Energy cost for pumping (Table 3-21)	?
Net Value of Added Agricultural Production	- 1
Secondary Economic Effects	0
Total Economic Benefit	- 1

Economic Cost

Net Energy Cost IPC System (Table 3-21)	
Total Cost \$22m. to \$63m.	
Less amount paid by new farmers \$7m. and revenue from off-season sales	16 to 47

Economic Benefit and Cost of Minimum Development Alternative: \$m.

Economic Benefit

Gross Revenue from Crops: 89 farms @ \$141,126 (p.A-51) at 1977 normalized prices	13
Less: Production cost (incl. labor, interest, pumping system cost @ \$14,327 incl. land cost \$36,000)(p.8-61)	10
Less: Electric energy cost for pumping (Table 8-21)	1
Net Value of Added Agricultural Production	+ 2
Secondary Economic Effects	1
Total Economic Benefit	3

Economic Cost

Net Energy Cost IPC System (Table 8-31)	
Less: amount paid by new farmers \$1m and revenue from off-season sales	3 to 8.5

Letter 42 Responses

1. Net farm income is now termed "net farm profit" in the FES, and any comparison to poverty level income has been removed. This would be the revenues left over after the farmer either allowed for 100 percent custom farming or paid himself for his own labor that had been expended on the farm.

2. Table 3-8 in Chapter 3 and Table 8-21 in Chapter 8 depict net farm profit under the different energy price situations and crop price levels. These net profit figures result from using the farm budget approach in Table 9 of Appendix 3-2. The 20 mills per MWH scenario is shown in Table 3-8.

3. At the present time the best protection that can be afforded cultural resources takes the form of National Register eligibility determination and subsequent inclusion on the Register. Most of the legislation designed to protect cultural properties is tied to this concept of significance and requires Federal agencies to inventory, evaluate, and seek comment regarding eligible sites in impact areas prior to project implementation. Adverse impacts must be mitigated to the satisfaction of the National Advisory Council on Historic Preservation. (Chapter 1, Cultural Resources, A-8, A-9).

Actual physical protection measures will vary from case to case and were not discussed in the ES because of space limitations. Suggested measures include avoidance, fencing, signing, and surveillance. It is not known how effective these various types of protection would be in the ES area.

The significance of many cultural properties in the ES area is widely recognized as evidenced by their formal designations described below.

The Birds of Prey Natural Area is not within the boundaries of the ES area (Map 1-2). This unique area is already listed on the National Register as the Guffey Butte/Black Butte Archaeological District and will undoubtedly be designated as an Area of Critical Environmental Concern within the BLM's planning system.

The Oregon Trail is a National Historic Trail and has also been determined eligible for inclusion on the National Register (Chapter 1 and 2). Portions of it in the Boise District are already listed. The Kelton Road has likewise been determined eligible for listing. As indicated in Chapter 4, Mitigation Measure #4, the BLM is committed to preserving a buffer zone on either side of the Oregon Trail in the ES area.

The Hagerman Fossil Beds area is a National Natural Landmark and has been proposed as a National Monument (Chapter 2). Fossils are protected under Federal law as "objects of scientific interest" (Antiquities Act,

1906). This concern is reflected in Chapter 4, Mitigation Measure #5, which prohibits any development within the Hagerman National Natural Landmark.

Other prehistoric and historic sites within the ES area are considered in terms of National Register eligibility (Chapter 2 and Map 2-8).

4. The FES has been revised to discuss such impacts. Refer to Chapter 3, Land Use Plans, Controls and Constraints.

5. The BLM would work with any affected counties if decisions were made to allow farm project developments. BLM would conduct specific environmental and economic assessments of the project and work at the county level concerning transportation and road problems, public purpose needs such as sanitary landfills, gravel pits and utility systems and impacts on community services. The DES was sent to all county planning commissions, but at this point, little consultation has taken place because farm expansion decisions will not be made until after the FES is published.

6. The counties in the ES area do not have a sophisticated system for zoning the public lands as agricultural in nature. Generally speaking, if the land is public, it is considered as having agricultural possibilities even though a detailed examination could reveal a particular tract as having no agriculture potential. Therefore, in actuality, the county zoning agriculture designation may not relate to lands capability to produce crops.



Marsing, Idaho 83639

July 2, 1979

43

Dean Bibles, Manager
Boise District BLM
230-Collins Road
Boise, Idaho 83702

Dear Dean,

The Owyhee Cattlemen's Association would like to express their disapproval of the proposed 111,000 acre public land development in Elmore and Owyhee Counties, under the desert entry Carey Act.

We feel that this proposed project which will affect 14,000 to 41,000 AUMs, or in other words 127 operators, would be a severe blow to the beef cattle industry in these two counties. It is especially untimely in regards to the upcoming EIS studies where AUM reduction looks eminent.

The increased farm land will require an increased demand for irrigation water, already short, not to mention the new demands for electricity to operate the irrigation pumps. This increase in demand for electricity will raise the electrical rates in order to give Idaho Power needed revenue to increase their power output.

These are only a few of the reasons we feel that this desert entry project is undesirable at this time.

Thank you for your consideration in this matter.

Sincerely,
Leon Church

Leon Church, Secretary
Owyhee Cattlemen's Association

LC/oc

cc: Idaho Dept. of Water Resources
" 100 YEARS -- Owyhee Cattlemen's Association -- 1878-1978 "

Golden Eagle Audubon Society
P.O. Box 968
Nampa, Idaho 83651

44

July 2, 1979

District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Sir,

I wish to commend you on your Draft Environmental Statement for Southwest Idaho. It is very comprehensive and presents facts and problems from all sides.

The Golden Eagle Audubon Society favors Alternative (3) allowing no agricultural development and rejecting all existing Desert Land Act and Carey Act applications and imposing a moratorium on further filings.

We feel that the lands most likely to be developed lie adjacent to the Snake River and its canyon. These lands are part of the feeding habitat for the raptorial and other birds or prey nesting in the canyon. To get the maximum benefit from the Bird or Prey Natural Area we must also protect the feeding ground of our wildlife.

The benefits derived from any further development seem to be at best only marginal. Costs of development are too high to make it economically feasible. We do not have the available power to warrant development. There is not enough water left in the Snake River for any additional development and still maintain the required minimum stream flow.

At this time we favor Alternative (3).

Respectfully,

Al Larson

Al Larson,
President, Golden Eagle Audubon Society



1412 16TH ST., N.W., WASHINGTON, D.C. 20036

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JUL 5 1979

July 2, 1979

202-797-6800

Bureau of Land Management
Boise District
Dean Bibles
District Manager
Bureau of Land Management
230 Collins Road
Boise, ID 83702

45

Dear Mr. Bibles:

On behalf of the National Wildlife Federation I would like to submit the following comments on the Draft Environmental Statement (DES) concerning agricultural development of Idaho public lands.

1. On the basis of the economic, energy and environmental information presented in Chapter V of the DES it is clear that the "proposed action" would not be in the national interest as required by §102(1) of the Federal Land Policy & Management Act (FLPMA). Of particular concern is the unjustified destruction of fish and wildlife habitat, especially the raptor habitat presently within the Birds of Prey Study Area, which would result from the conversion of 115,015 acres of public land to private agricultural development. It can hardly be in the national interest to sacrifice these public resources, not to mention the enormous social costs of bankrupting existing farming operations through skyrocketing energy costs, for the sake of a development scheme that would, in 13 out of 15 cases, show a net economic loss to the State of Idaho. Plainly, such a scheme would not strengthen the state's agricultural base--indeed, it will weaken it--but would simply give land speculators the goose that lays the golden egg (in the form of a 25¢/acre give-away of public land).

2. NWF strongly supports protection of the 500,000 acres presently within the Birds of Prey Study Area, and looks forward to a final Secretarial decision to withdraw that area from public entry. Existing Carey Act and Desert Land Act applications in that area should be rejected and no new applications accepted pending Secretarial and Congressional action.

3. On the basis of the adverse energy and economic impacts involved in further agricultural development within the E.S. area,

Dean Bibles
July 2, 1979
Page 2

45

NWF recommends that Alternative 3--Allow No Farm Development--be adopted until such time as the proposed development can satisfy the "national interest" standard of FLPMA. Alternatively, in the event that any development is allowed, it should be subject to the lease provisions of Section 302 of FLPMA.

4. NWF is also concerned that BLM not return to the piecemeal approach to DLE activity in Idaho, whereby each DLA or CA application is treated in isolation. Once a "programmatic" decision is made, we recommend that outstanding applications be dismissed, that a moratorium be declared and publicized and that appropriate actions be taken to classify these lands for alternative uses.

5. We would also suggest that the final statement consider, as an alternative required by FLPMA, increasing the production of agricultural commodities from lands which are presently in the various set aside programs of the Department of Agriculture. It may be that such an approach is more in the national interest--from an energy, cost, and environmental standpoint--than desert land development in southeastern Idaho.

We are grateful for the opportunity to present these views, and look forward to a copy of the final statement and your decision.

Sincerely,

Patrick A. Parenteau
Patrick A. Parenteau
Counsel

PAP:ks

cc: Bill Meiners
Phil Schneider

Letter 45 Responses

1. This is not judged to be a viable alternative although it raises an interesting point. Set-aside crop acreage fluctuates from one season to the next and it is impossible to estimate how much and the location of idle acreage even in the near future. Please see Letter 25, Response 3.

2.

The assumption of a decrease in available generation of electricity due to the pumping to 111,000 acres of 617 kwh per acre is a reasonably close estimate assuming that all reservoirs are full, operating at maximum head, and that no spill occurs at any time during the pumping season. This assumption is not likely in that the early season requirements and hydraulic capacity of the downstream dams is not fully utilized. In determining the economic impact on the Idaho Power Company due to the increased pumping requirement for new lands, it appears that the April and May hydropower losses were charged to the development at 35 mills per kwh or the cost of new generating capacity, when in fact the April/May Idaho Power generating capacity exceeds the load and that excess should be charged at surplus prices and not 35 mills per kwh.

In evaluating the farm repayment capacity the statement indicates a computed gross crop value for those lands of \$511.00 per acre. Recent studies by the University of Idaho show that a more reasonable value is \$590.00 per acre on the Bell Rapids system in 1977. Likewise, computed power costs in the statement indicate that for those acres served by high-lift pumping, that the annual power cost would be \$70.63 per acre; when in fact, in 1977 from Bell Rapids operating records, the actual power cost was \$49.22 per acre. The sensitivity of the economic analysis to these differences, both in crop value computation and power cost computation is most evident. With only these two differences in economic inputs, the analysis would show that an increase in income per acre would result raising it from \$13.96 per acre to \$113.52 per acre. This analysis as shown in Table 9 in the Appendix is obviously lacking in current data.

The estimate of wind-soil erosion as indicated in the statement appears to slant the inference that wind erosion on these lands is excessive. The statement indicates that from 0-75 tons per acre or one-half inch would be lost per year on the total acreage. One error in this computation appears to be that erodability data from the northern Great Plains was used and not that applicable to local soils and crop conditions in southern Idaho. If in fact, the 75 tons per acre which seems to be inferred in the statement were true erosion losses per year, then Bell Rapids would have lost five inches of top soil since it's beginning. This is obviously not the case.

3.

The report cites the historical decline in agricultural personnel in the affected counties. If this in fact is undesirable, then the Bureau of Land Management should be concerned that additional agricultural land is not becoming available in those counties. Studies show that nationwide decreases in agricultural land of three million acres per year are occurring due to urbanization. This trend cannot continue if the United States is to maintain its superiority in agricultural production around the world. The 111,000 acres in the proposed alternative for these lands could be a mitigating measure to the loss of some of our most fertile lands to urbanization. The evaluation of the impact of the increase in acreage on local, state and national markets is in error. The potato market, for instance, is not a local market or a state market or a regional market, when in fact it is a national market in which Idaho competes every year, and will continue to do so. An increase in potato acreage of twenty-two (22%) percent of 111,000 acres would make no dent in the national market.

The United States balance of payments which so concerns us now because of large expenditures for oil and cheap labor goods from other countries has been offset primarily by our agricultural food exports. This is historical fact and it will continue to be so as long as the United States maintains adequate lands, adequate technology to continue to produce at levels which will create these foods for export. Land is the key -- no technology, whether it be increased fertilizer technology, water management, soil management or whatever, will not help us keep pace unless the land is available.

The determination of the impact on the local economy and local markets assumes a five year build-out period for the 111,000 acres or approximately 22,000 acres per year. Anyone familiar with Idaho and Idaho's development through the private sector knows that five years is an unreasonable estimate for this build-out period. Financing, red tape and other impediments to development will surely make the buildout period ten years or more. This short assumed build-out period makes the impact appear tremendously greater than it actually would be. The economics of farm development of national markets and national economy will determine the amount and the rate of development. Those areas most feasible for agricultural development through irrigation will be shown by analysis and by in-depth feasibility studies. Those which are not economically feasible will never be built. And those which are will add to the productivity of our state and to the economic well-being of the counties affected.

TESTIMONY ON THE BOISE DISTRICT AGRICULTURAL DEVELOPMENT DRAFT ENVIRONMENTAL STATEMENT FOR SOUTHWEST IDAHO - June 13, 1979

By: Charles E. Brockway
706 Sunrise Blvd. N.
Twin Falls, ID 83301

Representing: Little Pilgrim Irrigation Company

46

The draft statement offered to agency and interested individuals is a monumental publication, one which cannot be properly evaluated in the short that was available for review, evaluation and comment.

In evaluating the alternatives under consideration, Little Pilgrim Irrigation Company favors the proposed alternative of 111,000 acres of public land development in the study area. The minimum acreage 28,000 acre development is really no alternative since the allowable acreages included are fragmented, difficult to farm in economical units and difficult to access economically by existing roads or possible new roads. The failure to evaluate or even consider obviously more energy and water efficient projects which use off-stream storage is a gross failure on the part of the statement. The objective of off-stream storage projects is to spread out the available generating capacity and minimize the impact on peak season demands. These peak season demands are the biggest impact which could effect generating capabilities of Idaho Power Company. The report indicates that 2.58 acre feet per acre would be pumped from the Snake River with a fifteen (15%) percent or .39 acre feet per acre return flow via either surface return or groundwater. These estimates are based on modified Blaney-Criddle procedures which have been shown by recent data to be in error. Recent updates on consumptive use and diversion show that at least .8 acre foot per acre would return from deep percolation. This would thereby decrease the impact on the Snake River at the gaging station at Murphy.

The environmental statement also indicates that 2.58 acre feet per acre diversion would be for a normal year and that 3.51 acre feet per acre would be the estimated diversion in a worst year case. 1977 is considered by many to be a record drought year. In 1977 the Bell Rapids irrigation project diverted only 2.62 acre feet per acre to the 25,000 acres served. Using this level of diversion for a worst year case would result in twenty-five percent (25%) less impact on the Murphy gage than is estimated in the report. In other words, a decrease or a shortfall of 750 cfs instead of 1,000 cfs at Murphy.

It would appear that the positive benefits to the environment due to agricultural development have been totally overlooked. The increases in wildlife habitat that can be afforded by proper agricultural development with set-aside acreages, potential fisheries improvement through offstream reservoirs, water supplies for cattle and wildlife have all been neglected. One need only look at the Bell Rapids Development to see the tremendous improvement in the area over bare ground and sagebrush. There are many who feel that green fields and crops producing an income from the land are more preferable than the desert.

The biggest impact seems to be the estimated decrease in hydropower production in the Idaho Power Company system and the increased demand during peak seasons on generating facilities. In evaluating the calculation of downstream hydro losses on the Idaho Power Company system, the report itself indicates that power losses at Lower Salmon are underestimated. One would ask "why are they underestimated" and "why was the report put out with them not fully taken into account?" The statement looks at the 48 year power generation synopsis and evaluates the average generation using average flows. The correct procedure would be to look at generation as computed with actual flows which is the procedure used by the Idaho Department of Water Resources, which gives a better indication of the actual generation and capacity. Apparently much data from the Idaho Department of Water Resources was used in the hydrologic study and in the power study, and as such it was necessary to use the Idaho Department of Water Resources river operations model in most of these determinations. The model was relied on heavily and yet the report says that there are "a number of other errors in the computer model". It would seem only right that those errors, if in fact they are known by the writers of the study, ought to be enumerated.

The approach and the objectives of the Bureau of Land Management in putting forth the draft statement are admirable. However, one gets the feeling that the ultimate decision will be made not by local Bureau of Land Management and other agency officials, and the local people involved, but by some higher echelon administrator, unfamiliar with the problems and the people, the needs and the desires of Idaho. This feeling is enforced by the obvious intent to decrease or to limit the input from one of the most knowledgeable officials in Idaho on water resources and power at recent hearings. When in fact the director of the Idaho Department of Water Resources was not allowed to finish his statement

at the hearing in Twin Falls, Idaho on the statement, but yet the administrative law judge was allowed over thirty minutes just to explain the rules and procedure of the hearing indicates to me that the intent is not to solicit input from people affected, but to do things by the book regardless of the ultimate impact on the people of the State of Idaho.

1. Please refer to Letter 37, Comment 1.

2. We cannot agree that recent data have shown our return flow estimates to be in error. The study referred to in this comment is a water use study on the Bell Rapids project. There are several problems with applying these data to our proposed action:

- The Bell Rapids project is different than the typical development depicted in the proposed action. It has larger average farm size, better soils, lower lift heights, better production capability and less horizontal pumping distance.

- The Bell Rapids study results are questionable because project diversions were estimated from electrical energy consumption, not measured; canal losses were estimated; and, evapotranspiration estimates were made using data from Kimberly, some 50 miles east from the study area and having a much different micro-climate than the study area.

- The assumption is made that all percolated water returns to the Snake River. This is a questionable assumption. In fact, there is no documented proof that this is the case. It is known that much of the study area is underlain by highly impervious sedimentary formation which would cause percolated water to form perched and isolated water tables. Because of this uncertainty, it would be unlikely that all percolated water would return to the river.

Because of these inconsistencies, we cannot justify using data other than that used in the DES.

3. The 3.51 ac.ft./acre diversion figure used in the DES is taken from a study done by Corey and Sutter in 1970. This is a highly recognized reference for crop water requirements. The argument that Bell Rapids reported an average diversion of 2.62 ac.ft./acre in 1977, and, therefore, 3.51 is much too high cannot be sustained when applied to the entire study area. There are important reasons why 2.62 cannot be accepted as a better figure.

The comment infers that 1977 was a "worst case year". It was a drought year in the regard that irrigation water supplies were deficient in many areas, primarily storage reservoirs. It would not be considered a drought year from the standpoint of precipitation received during the growing season. A check of the amount of precipitation received at Glenns Ferry shows that of the months of March through August, March, April and June were below normal. The other three months were above normal. The total precipitation for the six month period (March-Aug.) was 3.37 in. in 1977, compared to a normal of 2.88 in. Therefore, there is no evidence to indicate a change in the figures used in the DES.

4. The response to Commentor #14 discussed the hydroelectric losses on Snake/Columbia River dams downstream from the Idaho Power Company's system and the value of 617 kWh/acre-foot used to calculate hydroelectric losses at the eight Snake/Columbia River dams affected. These hydro losses were assumed to have a replacement value of 35 mills/kWh to the Pacific Northwest. These Pacific Northwest hydro losses were not included in the cost input analysis to IPC customers.

Hydroelectric loss estimations on the Idaho Power Company system dams do account for variations in head, and periods when flows are in excess of the hydraulic capacity of dams.

In estimating supply requirements and cost impacts due to proposed action irrigation demand, April, May and October hydro losses were treated differently in the four supply scenarios. In cases where it was assumed that IPC would rely on outside sources, such purchases were assumed to not be required in April, May and October when resources normally exceed load. In cases where IPC constructed new generating capacity sufficient to meet the July load of the proposed action, the cost impacts are a function of the annual cost and generation of the new plant, and are not influenced by April, May and October load conditions.

5. The higher income per acre in the Bell Rapids Project in 1977 can be attributed to the fact that 50 percent of the acreage planted to crops were potatoes, compared to 22 percent assumed for a typical proposed action farm (see Chapter 1). Potatoes produce the highest economic return of any other cash crop grown in the ES area.

In 1977, according to information supplied by the Idaho Water Resources Research Institute, Bell Rapids used an average of 3146 kWh/acre. Pumping lift at Bell Rapids from the Snake River up to the farmland is a little less than 650 feet. However, a typical ES farm is located 4-6 miles from the Snake River with a 650 foot lift and would use 3478 kWh per acre because of "horizontal" water delivery energy use. Bell Rapids project, therefore, uses less energy (lower costs) than the typical proposed action farm because of its close proximity to the Snake River.

6. Chapter 3 and 8 text of the FES has been modified to reflect your comment.

7. See Letter 25, Response 1.

8. Under the Time Frame section, Chapter 1, it is explained that each DLA project would take at least four years to construct, with the possibility of time extensions. Carey Act projects could legally take ten years. It is clear that 111,015 acres under the proposed action, or for that matter any of the alternative levels of development could not be "built-out" and patented in just five years. The intention is to "authorize" farm development on an orderly basis from 1980 through 1984.

9. See Letter 7, Response 2.

10. Hydroelectric losses have been re-estimated for IPC dams in the FES. The explanation of the methodology for these hydroelectricity estimations is contained in Appendix 3-5.

All IPC dams affected by irrigation diversions in the study area, including Lower Salmon Dam, are included in the estimates. The procedure used to estimate hydroelectric generation losses used the average monthly flows from 48 years of records to estimate monthly generation with and without the proposed action diversions. This procedure was used in order to make hydroelectric generation comparisons consistent with the methodology used by IPC. However, IPC uses median rather than average monthly flows.

A major problem in the estimations of hydroelectric losses in the draft was a different monthly distribution of water diversion for direct demand and hydroelectric loss estimations. This has been corrected in the FES.

COMMENT: I would like to make a few comments concerning the economic impacts of the Boise District Agricultural Development Draft. In particular, I would like to cover those impacts in the areas of electrical power, and farming.

Should the proposed action be implemented, it is clear that the electricity demand cannot be met by the current company-owned generating resources of Idaho Power. (3-73) After outlining several alternatives open to Idaho Power to make the necessary power available for farm development, the draft arrives at the two most likely possibilities. (3-73 through 3-76) The first of these is entitled case 1B, which calls for Idaho Power to build a 250 MW coal fired plant and export the excess power at a low price, with the plant operating at 65% of maximum output. (3-73 & 3-75) The second case is entitled case 2, and calls for the purchase of shares in new power plants built by other utilities in order to meet the demand for power. (3-75)

The entryment under the proposed action would not pay the total cost of obtaining the necessary power but would be subsidized by the other Idaho Power ratepayers. (3-76) The average yearly increase to 1977 customers would be as follows:

	Case 1B	Case 2
Irrigators	\$819	\$279
Residences	90	30
Small Commercial	670	220
Large Commercial	42,605	14,202

(Table 3-20; page 3-77)

These rate increases would have the probable effect of causing "severe hardships to low income house holds", and "it is possible that some existing irrigated land would be forced out of production." There would be the additional impact



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July 1, 1979

District Manager
Bureau of Land Management
230 Collins Rd.
Boise, Idaho 83702

Dear Sir:

We would like to have the following comments which are related to the "Draft Environmental Statement - Boise District Agricultural Development" - included in the hearing record.

The reduction of the stream flow of the Snake River is not seriously considered nor accurately measured in this document. The entire area would be significantly changed by the kinds of development suggested. A great deal more study must be given to this area before more water is taken from the Snake for agricultural, or other, purposes.

The area near the Malad River Bridge on the South side of the Snake River where cave-ins which caused the demise of the King Hill Irrigation ditch and terrible visual degradation to the landscape, is an existing example of the need to understand the geological features of the district before proceeding with further agricultural development. No one is prepared to say whether the cave-in was caused by years of seepage from Idaho Power dams, recent changes in the sub-soil due to Ball Rapids, or a combination of those two and perhaps other events. It is imperative that we know causes and effects before blithely putting more land under cultivation.

The document in question does not treat most of the social problems which would be created by the development envisioned, i.e. the increase in energy use and price, the importation of alien workers, the proliferation of the larger "company" type farms, etc.

Thank you very much for your consideration.

Sincerely, *Richard Boulter*
Mr. & Mrs. Aldrich Boulter

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of increased economic pressure on existing pump irrigators. (3-78 & 3-80) Should the proposed action be implemented, 5.2 million dollars a year (7.3 million-worst case year) would be required to replace the lost hydroelectric generating capacity due to stream flow depletions.

In its analysis of the trade off between the commitment of electricity resources and the increase in agricultural production the EIS states at 3-80:

"... to the extent that the energy subsidy necessary to maintain the proposed action in operation increases the economic pressure on existing farms, it is questionable whether the proposed action would actually result in significant long term gains in agricultural production."

Given the case of average farm production, it would also seem that a 320 acre irrigated farm, is not a viable economic unit. Table 9 of Appendix 3-2 of the draft, projects an income of \$13.36 per acre where 310 acres are actually pump irrigated out of a 320 acre farm. This is a total yearly income of \$4,141.72. Somewhere below the poverty level, it would seem. A larger return would be received if the production cost of \$103,797.81 was invested in an investment with a 9 or 10 percent annual return. The May/June 1979, Northern Edition of Western Hay and Grain Grower, at page 9, cites a study done by researchers at New Mexico State University's Agricultural Experiment Station ("Cost and Return Analysis of 160 and 320 acre Farms in the Elephant Butte Irrigation District"; Research Report Number 384) as follows:

"With farms of 160 to 320 acres, farmers would have to plant approximately 50 percent of their land to high-value vegetable crops and obtain above-average yields to get a return to capital, land, and management competitive with current interest rates."

To conclude, by implementing the proposed action the BLM would in effect allow a tax to be imposed upon the present IPC rate payers in order to subsidize what are at present noneconomic farming units. This would seem to be the only logical and reasonable conclusion to be reached by the facts and figures set forth in the EIS. In light of this, I would recommend that Alternative 3 (no development) be implemented by the Bureau.

By leaving the land in its present use, livestock grazing, none of the adverse impacts set out in the EIS would occur. The land will always be there for development by future generations, should they ever have need of it.

Blumen Sheep Co
Lester Blum

Date: 6/24/79

Letter 49 Responses

1. In some cases stubble is grazed by livestock after the grain has been harvested. However, most existing high-lift farmers in the ES area will plow under the stubble or use the resultant volunteer growth for an organic matter manure soil builder.

There is no question that alfalfa and grain grown on new farms could more than compensate for the loss in AUMs on the converted public lands. This forage, nevertheless, would be much more expensive than grazing fees on the public lands. Please refer to Chapter 6, Livestock Grazing for an analysis.

RECEIVED

JUL 5 1979

STATEMENT ON DEVELOPMENT OF BLM LAND UNDER THE DESERT LAND ACT AND CAREY ACT

49

-Gordon Tate, Idaho State Grange

Bureau of Land Management

Boise District favor moderate but steady development of this land at the present time for the following reasons.

1. A do-nothing, no development program would not protect Idaho's claim to her water. If we can not show we are going to use our water, it will most likely be diverted to the south-west and lost to Idaho.
2. Our state water plan calls for continued development of suitable land, partially for the above reason.
3. Population is increasing while we lose land to highways, industry, urban sprawl, golf courses, parks and other recreation areas. It is estimated the United States loses 3 million acres of agriculture land this way each year. One look at the Boise-Meridian area will show you what I mean. If we do not keep on developing agriculture land, we could conceivably end up with a food shortage the same as we have for oil.
4. We need to keep pace with other areas to maintain our normal growth. Washington is developing 200,000 acres under the Bacon siphon, with more planned for the future. It is true that we do have surplus crops at times, but better to have a surplus than a shortage. The developing nations may catch up or surpass as they have in oil production.
5. Agriculture is an energy-producing industry, by far greater than any other. If we can learn to use this production for alcohol or other forms of energy, we can solve much of our present energy crunch.
6. One look at the industry in south Idaho shows what agriculture has done for the state. Without the use of our water, we would have almost nothing.
7. Irrigation of our land has provided a great amount of game and wildlife; future development will continue to do so. The sage hens that once lived sparsely in the area have succumbed to coyotes and hunters.
8. Statements as to loss of grazing are incorrect. The aftermath from irrigated crops as well as the hay and fodder produced is much greater than the sparse grass and sagebrush that now occupies the land.
9. The return flows from this project give us double use of much of this water. Much of the power requirements are off-season, especially where off-stream storage can be developed. This type of use is an absolute must for the future of Idaho and America.
10. What is better - dry, unproductive sagebrush flats or green fields, producing for Idaho's economy and America's needs. The sagebrush flats would not even support environmentalists, who profess to live on practically nothing and try to make the rest of us do the same. Remember - a no-growth policy would not only hurt Idaho - it would kill America as well.

Gordon Tate

RECEIVED
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BOISE DISTRICT

REPLY TO ATTN OF: M/S 443

JUL 3 1979

Boise District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Sir:

The Environmental Protection Agency (EPA) has completed its review of the draft environmental statement for Southwest Idaho Agricultural Development. EPA has serious questions about the feasibility of this proposed project on both environmental and economic grounds. Conversion of some 111,000 acres of arid lands to irrigated farmland appears to be marginally economical at best, while imposing significantly increased energy costs on existing ratepayers, potentially oversupplying the market for certain agricultural commodities, which may lower prices for existing farmers, and significantly reducing low flows in the Snake River, which would adversely affect fisheries habitat. It is not entirely clear that the proposed project is consistent with the policy of the Federal Land Policy and Management Act of 1976 (FLPMA) that disposal of public land must be in the national interest. Our specific comments follow.

1. On page 3-16 it is said that only 1.5 miles of riparian vegetation on public lands would be lost under the proposed action. It is not clear whether this includes the effects on riparian vegetation of reduced flow rates from irrigation withdrawals. Would reduced flows have an effect? Would riparian vegetation on private land be affected?
2. We are concerned about the effect of flow reduction on sediment carrying capacity and streambed sedimentation in low flow years. Reduced flows, coupled with periodic increases in sediment movement to streams from water and wind erosion, may compound existing sediment problems mentioned on page 2-17. Nutrient loading of tributary streams also appears to be a potentially significant problem. The proposed action would also exacerbate existing violations of State water quality standards for temperature.

ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

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Action:	
Comments:	

3. The 5-25% reduction in populations of game fish in the project area due to flow reductions, impoundment, and increases in temperature, sediment, and nutrients is an adverse impact of considerable concern, especially in the case of white sturgeon, a sensitive species relying heavily on the project area for habitat needs. Of equal importance is the contribution of this proposed irrigation withdrawal to reductions in anadromous fisheries downstream in the Snake and Columbia River systems. These fisheries are of increasing importance both commercially and recreationally, and any potential reductions must be considered significant.

4. The proposed project would add to existing periodic violations of air quality standards for particulates. We suggest that the measures mentioned on page 3-4 to reduce wind erosion also be highlighted as means to reduce air quality violations.

3

5. The discussion of water resources and fisheries in the section on "future environment without the proposed action", beginning on page 2-88, depends heavily on assumptions from the State Water Plan. However, that plan calls for the addition of 292,000 irrigated acres in southwest Idaho, including the acres that are part of the proposed action. Therefore this is not a description of the future environment without the proposed action, and does not provide for meaningful comparisons with the discussion of impacts of the proposed action. This should be corrected.

4

6. The section of Chapter 1 dealing with interrelationships with other governmental programs should mention the statewide water quality management planning being carried out by the Idaho Department of Health and Welfare under Section 208 of the Federal Clean Water Act. This planning effort, funded and administered by EPA, deals specifically with irrigated agriculture and conversions of desert land under the Desert Lands and Carey Acts. It establishes Best Management Practices (BMP) which are necessary to correct or prevent identified water pollution problems from agriculture.

5

7. If the proposed project were to proceed, the purposes of the State Water Quality Management Plan would best be served if BLM utilized all available authority to encourage or require farmers receiving land under the proposed program to adopt land management plans under Soil Conservation Districts and implement BMPs contained in such plans. Such actions would be required in alternatives dealing with land sale or lease under FLPMA but are not mentioned for BLM action under the Desert Lands or Carey Acts. It is not clear that

6

such requirements could not be part of the approval process under the latter two acts. An environmental review is supposed to be part of such approval, and page 3-1 states that catchment ponds for irrigation return flows are required for approval. We suggest that other BMPs be required as well, and that if this is not possible, an explanation be included in the environmental statement.

8. Information presented in the section on economic impacts and elsewhere appears to indicate that new farms developed under the proposed project are not likely to be economically viable. Table 3-8 shows that only under high crop prices (1976 Normalized) and low energy costs is net income likely to be positive. However on page 3-67 and 3-68 it is indicated that increased production would cause a drop in prices for most products, up to 34% for potatoes. In addition, under the most likely energy cost scenario discussed on pages 3-76 and 3-77, electricity costs for irrigation are expected to increase considerably. Therefore it appears that farm development under the proposed project would produce negative net incomes. In addition, since available water would be overappropriated in low flow years according to information on page 2-89, it is not clear whether junior appropriators would have any irrigation water available in such years.

7

Not only would new farms be submarginal, but the potentially increased crop production and need for expensive new electricity generating facilities could raise costs and lower revenues for existing farms in the area. One effect of this would be to decrease the likelihood that existing farmers, let alone new farmers, would undertake the expense of implementing BMPs to protect soil and water quality.

9. The policy stated in the Federal Land Policy and Management Act of 1976 is that "public lands be retained in Federal ownership unless... it is determined that disposal of a particular parcel will serve the national interest (Section 102.a(1))." Another policy is that "the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values (Section 102.a(8))." The significant adverse environmental and economic impacts of the proposed project do not appear consistent with these policies. At minimum, this inconsistency warrants discussion in the environmental statement, and would appear in addition to indicate abandonment or modification of the proposal as the appropriate course of action.

8

Based on the environmental impacts from the proposed project, especially fisheries impacts as discussed above, and considering the highly questionable benefits, EPA has rated this environmental state-

ment ER-1. ER (Environmental Reservations) indicates that we have serious reservations about the project on environmental grounds and believe that substantial modification of the proposal is required. The rating of 1 indicates that the environmental statement contains adequate information. This rating will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act, as amended.

Thank you for the opportunity to review this environmental statement. If you have questions or would like to discuss these comments, please feel free to contact me at (206) 442-1285 or (FTS) 399-1285.

Sincerely,

Alexandra B. Smith
 Alexandra B. Smith, Chief
 Environmental Evaluation Branch

Letter 50 Response

1. With the wildlife mitigation measures discussed in Chapter 4, no natural riparian vegetation would be destroyed by farmland conversion on public land. There may be some slight reduction of riparian type of vegetation along the Snake River with irrigation withdrawals. However, this is impossible to judge because water level reduction in the Snake River from pumping would depend on channel width, depth and flow velocity at any given point on the river.

2. Accepted in part. As noted on p. 3-12 and 3-13 of the Draft Environmental statement (DES) we expect some earlier settling of suspended solids in the relatively low-gradient area below Hammett, although it is also expected that these sediments would tend to move on into the downstream reservoirs in years of higher flow. On the other hand, withdrawal of river water in the project area in low-water years would tend to slightly reduce the suspended sediment load in the river as the return water from the project will filter through the substrate and re-enter with lower turbidity. Offsetting this is a probable increase in wind-borne sediments. Most bedload movement occurs in the Snake River in the maximum-flow period of April and May, whereas maximum water withdrawals (and maximum effects on river flow) would occur in June-August. The net reduction in bedload movement in low-flow years as a result of project activity should be very slight. The occurrence and effect of unpredictable overland flows in severe storms (largely in spring) is mentioned in several places in the DES (see pages 3-12, 3-14, 3-16 for examples). The discussion on sedimentation in Chapter 3 of the Final ES (FES) has been revised to clarify sedimentation impacts.

Nutrient loading in tributary streams is discussed in the DES on page 3-13, 3-14, and 3-15. Increased nutrients in tributary drainages would cause stimulation of riparian plant growth where little exists now. Increased riparian vegetation would benefit wildlife by creating new habitat. It is very doubtful that significant amounts of nutrients would reach the mainstem Snake River, however, due to the small amounts of waste water returns off farm areas and the requirement of catchment basins. Phosphates would not increase as a result of the proposed action, but total dissolved solids and nitrates would increase slightly. Temperature effects are noted on page 3-12 of the DES.

3. The FES text has been revised to reflect your comment.

4. With or without the proposed action, the State Water Plan calls for 292,000 additional irrigated acres by 2020. Therefore, if the proposed action does not take place, similar development must be assumed elsewhere in Southwestern Idaho. The major difference between the "future" and the "proposed action" is that the future does not involve development of public land by high-lift pumping.

5. The FES text, Chapter 1, has been revised in accordance with your comment.

6. The BLM has no legal authority to enforce best management practices (BMP's) under the Desert Land and Carey Acts. This is clarified under Authorizing Actions of Chapter 1 in the FES. The BLM can insert terms and conditions designed to insure protection of the environment in the construction of reclamation (irrigation) works. The catchment ponds are considered part of the irrigation systems.

7. One must assume that priority water rights would be protected. Junior appropriators would not have water available, or amounts available would be less than needed.

8. An ES is not a decision document itself, but presents impacts associated with an array of alternative actions. The "proposed action" is one of these alternatives. Until an ES is written, it is not possible in many cases to be aware of the environmental, economic and social consequences. In accordance with the Idaho State Water Plan and the DLA and CA development demand for the land, the proposed action was based on a reasonable agricultural expansion program in the ES area. However, as stated in Chapter 1 Proposed Actions, "The proposed action is not to be construed necessarily as the BLM's position, but rather a logical course of action to be taken if agriculture expansion in the ES area took place." Therefore, based on impacts presented in the ES, it is conceivable that the BLM decision may not be in alignment with the proposed action.



United States Department of the Interior

IN REPLY REFER TO 1793(930)

RECEIVED

BUREAU OF LAND MANAGEMENT Idaho State Office Federal Building, Box 042 550 W. Fort Street Boise, Idaho 83724

JUL 6 1979

52

Bureau of Land Management Boise District

July 3, 1979

To: District Manager, Boise District
From: Chief, Division of Resources
Subject: Comments on the Agricultural Development ES

Table with columns for initials (DW, A/JM, R/PM, O/PER, ADM, C/ASC, BRUN, D/WY, J/ARB, L/END, L/IB) and rows for Action and Comments.

The State Office Hydrologist received the verbal comments from local USGS personnel. The summary of the comments are attached for your information.

Enclosure as stated



Save Energy and You Serve America!

July 4, 1979

Bureau of Land Management

Gentlemen:

51

Please enter our comments in your records concerning the new irrigation development in Southern Idaho. The major concern is the 111,000 acres of class I and II soil between Suhl and Murphy.

We have given this subject considerable thought and have come to the conclusion that the negative impacts far out weigh the advantages.

The following, in as brief as possible form, are the reasons we oppose the new land development at this time.

- 1. Increased expenses for the Federal Government - taxpayers money.
a. increase in the number of acres that would qualify for Government set a side programs.
b. Disaster relief payments would be applied for in short water years. Sufficient water availability for this new land looks pretty questionable.
2. We feel that the storage of water in the winter is not feasible due to freezing temperatures that cause ice jams and canal breakage. Canal maintenance will be impossible when the ground is frozen.
3. As farmers we are continually reminded of our over production. The development of new land will only compound our plight.
4. We are also concerned about decreased river flows. This coupled with an increased demand for electricity will stimulate a negative effect for all people in Idaho.

The development of new land will force Idaho Power, whose service area is effected, to add new power facilities. The main impact would be an increased cost to existing Idaho Power Co. customers.

Electrical rate structures are presently out dated, they adhere to the theme of promoting consumption. "Energy Crisis" is a relatively new problem and original PUC rules and political battles make needed changes hard to come by. There is hope, however, as seen in the Utah Power and Light Co. refund settlement. The decision basically concerns guidelines that will lower the amount customers can be charged for the construction in progress. Arrangements were made that mean UP&L customers will no longer help pay for the construction of new generating capacity that is not built to serve their own needs. This indicates that positive changes are being made and hopefully they will be applied in Idaho as well.

There is no need for existing farmers to subsidize new irrigation projects especially when the end result is to 1. increase commodity production which lowers prices and 2. increase cost of production through larger demands on fertilizer and power production.

We are firm believers that the cost burden of new land development should not have to be shared by people who do not receive any direct benefit.

We can also truthfully say that the above views are the same feelings that have been expressed by the majority of Gooding County Farm Bureau members.

Thank you to Jim Erickson, Harpen Steen - Boise, Id. 83714

COMMENTS ON AGRICULTURAL DEVELOPMENT ENVIRONMENTAL STATEMENT

52

- Page 2-8 The station above Idaho Falls is called the Snake River near Shelley. The source of the flow data should be referenced. | 1
The gaging station below Milner Dam shows an average discharge of 2491 cfs (1927-77). Is the flow of 1600 cfs for the years (1928-68) representative of the historic record? | 2
Page 2-10 The USGS 1978 report shows 1.99 million acres irrigated of which about 1 Million acres are irrigated through diversion. | 3
Thousand Springs below Hagerman is actually a spring area about 70 miles in length. The description does not point this out.
The reported 9900 cfs is low when compared to the 1930-77 period of record of 10800 cfs. What period of record is the 9900 cfs representative of? | 4
The USGS reports 2.5 Million acres of irrigated land as opposed to the reported 2.8 Million acres. 675,000 acres are reported by USGS to be irrigated from groundwater. | 5
The USGS reports a minimum of 5.8 cfs in July at 1977. Would this lower flow figure intensify your analysis? | 6
Page 2-13 In addition to the serious pollution loadings mentioned, fish hatcheries may also be a significant source. | 7
Page 2-18 If Sphaerotilus is worth mentioning, it may be well to describe the problems that are caused by the iron bacterium. (Importance to water supplies might be mentioned.) | 8
Fecal coliform bacteria are associated with bacteria originating from the intestines of warm blooded animals which may be associated other bacteria or virus that are disease causing. Fecal coliform should not be thought of as pathogenic, only an indicator that pathogens may be present.

1-3. FES text has been revised to reflect the comments.

4. The actual average, taken from the base flow data on Table 2-4, is 9,953 CFS. We are not aware of the source of the figure 10,800 CFS that you refer to.

5. FES text has been revised to reflect the comments.

6. This change is not significant to the analysis.

7. See Letter 20, Response 23.

8. FES text has been revised to reflect the comment.

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The Twin Falls Canal Company is concerned that proposals to gravity water to the additional acres sought to be developed west of Twin Falls will take the same form as have recent proposals wherein entrymen propose to piggyback the system of the Twin Falls Canal Company rather than constructing the type of facilities necessary for the development and irrigation of their land. Irrigation farmers throughout America have spent literally millions of dollars to eliminate others from common facilities.

The Twin Falls Canal Company is also a co-applicant with the North Side Canal Company for a Federal Energy Regulatory Commission permit to construct a powerplant at Milner Dam to utilize the winter flows of the Snake River at Milner for power generation purposes. The companies jointly hold a water right application which predates the Idaho Water Resource Board's Bruneau Plateau proposal. The Company's present disposition is to pursue that construction diligently. The development of that powerplant pursuant to that permit, if determined as compatible with State water policy, will essentially eliminate the potential diversion of winter water by gravity at Milner Dam for use on the deserts of Owyhee, Elmore, and Twin Falls counties unless prior upstream water rights were obtained and transferred to a diversion point at Milner.

Presently the Idaho Department of Water Resources is studying the development of the Bruneau Plateau project. They have identified far more acres than has the BLM for potential entry and development in this area as well as in all of Idaho. While the Twin Falls Canal Company Board of Directors is of the opinion that farm land development in light of today's farming constrictions and surpluses is not prudent, it also seems imprudent to cast in stone a decision to lock up all of the acres except those which the environmental draft suggests would be developed on a systematic basis. Land and water are both finite resources and the priorities of the United States might well be for their development in the near future. At this point in time, the alternatives should be kept open. The land should not be locked-up.

It is easy to understand the "no growth" and "retention" motivation of the BLM. But public lands are owned by the public and should be utilized in their best interests. If starvation were to occur in the United States, obviously, the public's best interest would be the production of food.

A lawsuit presently pends in the District Court of Ada County to determine whether the water filings made under

NELSON, ROSHOLT, ROBERTSON, WALKER, TOLMAN & TUCKER

ATTORNEYS AT LAW
THE IDAHO FIRST NATIONAL BANK BUILDING
P. O. BOX 1908
TWIN FALLS, IDAHO 83301

THOMAS G. NELSON
JOHN A. ROSHOLT
J. EVAN ROBERTSON
THOMAS G. WALKER, JR.
STEVEN K. TOLMAN
JAMES C. TUCKER

July 2, 1979

53

TELEPHONE
AREA CODE 208
754-0700

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State law which now pend will be recognized or whether they will be subordinate to the power rights of the Idaho Power Company. The ultimate decision in that case as it effects State water policy will ultimately decide whether or not the lands which you suggest should be developed or the total lands that everyone suggests should be developed, will have adequate water supplies.

The future of the State of Idaho, even as it relates to the public lands which are located within the State, are better determined by the people of the State as opposed to those who would recommend long term and irreversible decisions for the lands within their jurisdiction. It is our best judgment that recommended decisions should only be to the short term, since all plans must be dynamic and constantly changed to meet the needs of the people.

At the hearing on the 13th of June in Twin Falls, I was disappointed that the official representative of the State of Idaho was only accorded ten minutes and was cut off from further testimony at the end of that time. That witness represented the Idaho Water Resource Board which had been making similar studies for some 15 years in Idaho. This seems extremely discourteous especially in light of the fact that it took the hearing officer nearly some 30 minutes to explain the rules under which the hearing would proceed and the hearing was then started some 30 minutes late.

Respectfully submitted,

John A. Rosholt
JOHN A. ROSHOLT

JAR:bg

District Director
Department of Interior
Bureau of Land Management
Boise District Office
550 West Fort Street
Boise, Idaho 83724

Re: Public Hearing - Draft Environmental Statement -
Agricultural Development

Gentlemen:

This firm represents the Twin Falls Canal Company. This statement is authorized by their Board of Directors and I hereby request that it be included as a part of the public hearing proceeding that occurred in Twin Falls on June 13, 1979.

The Twin Falls Canal Company is perhaps the most successful Carey Act development that has occurred in the United States. The Company now operates a complex system of canals, laterals, coulees, ditches, irrigation structures, for the delivery of irrigation water to some 202,000 acres of prime farm land, all of which are located in Twin Falls County. Senior citizens tell us that there has never been a complete crop failure on the Twin Falls tract and its history certainly justifies in retrospect the wise decisions made by the members of Congress, State leaders, and the investors who brought this dream to fruition at the turn of the century.

While the farming climate does not now appear conducive to additional development of raw land, it is apparent to our directors that the BLM must abide by the present court decision on the Carey Act which requires the segregation of substantial amounts of land whether or not such segregation would be necessarily compatible with the purposes of the BLM Organic Act. It is ludicrous to suggest that a limited amount of acres would be developed and the rest retained in public domain following a direct order from the U.S. District Court, as affirmed by the Ninth Circuit Court.

1. See Letter 7, Response 5.

1. Allow the state or perhaps counties to acquire permanent access to the state lands.
2. Cooperate with the Department of Lands in identifying manageable grazing units of land that could be acquired through land exchange. The exchanges should be completed before the land is allowed to be converted to cropland. This recommendation would apply to lands currently classified for exchange. There are some parcels classified to sell at a future date, also, some parcels could be reclassified to sell which would not be affected.

My concern is what affect your decision will have on the income to the endowment and proper use and protection of the states' resources. It appears the decision to allow conversion to cropland could leave the state with isolated parcels of land that would be difficult to lease for grazing. Your decision could cause the state to sell the affected lands which may or may not be beneficial for the endowment, depending on whether or not the individual parcel is suitable for cropland development.

Sincerely yours,

Howard K. Kestie
Area Supervisor

HKK:bk



STATE OF IDAHO

DEPARTMENT OF LANDS
STATEHOUSE, BOISE, IDAHO 83720

3 July 1979

Address reply to:
DEPARTMENT OF LANDS
SOUTH CENTRAL AREA
BOX 149
GOODING, IDAHO 83330
PHONE 934-5606

1. The FES has been revised to reflect the impacts you discuss on state lands in the ES area. See Chapter 3.

District Manager
Bureau of Land Management
230 Collins Road
Boise, ID 83720

Dear District Manager,

I have briefly reviewed your Draft Agricultural Development Environmental Statement. The state lands in the South Central Area that are involved in the E.S. are east of Range 7 east.

Should the BLM decide to allow the lands to be converted to farmland, the state might expect the following impacts:

1. Poor or undesirable access to state lands.
2. The state lands are presently leased for grazing. If they become surrounded by cropland, they could become difficult to lease for grazing purposes, therefore the endowment income could be seriously affected.
3. The demand to sell the state lands, adjoined by cropland, could be expected to greatly increase.
4. Most of the state lands involved are classified for exchange to the BLM. The decision to allow the BLM lands to be converted could affect our long range land exchange plans. If the lands are not exchanged before the land is converted, they may be reclassified to sell which could also affect the endowment long range income.

This office recommends the Bureau consider the following actions with the Idaho Department of Lands before the land is allowed to be converted to cropland, assuming the final decision is to allow cropland development:



JOHN V. EVANS
Governor

C. STEPHEN ALLARD
Director

Mailing address:
Statehouse
Boise, Idaho 83720
(208) 384-2215

July 3, 1979

55

District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

June 29, 1979

56

Dear Sir:

These are comments on the Boise District Agricultural Development Draft Environmental Statement for Southwest Idaho.

1. Page 3-5, Crop Production, paragraph 1 - Table 1-3 should be Table 1-4 if you are indicating the percent composition of crops to be grown. Table 1-3 on page 1-9 summarizes acreage to be irrigated. | 1
2. Wind erosion estimates on pages 1, 2-6, 2-7, 3-6, 3-8, 5-1, 8-46, and 8-82 - an estimate of 0 to 75 tons average annual soil loss is used. The 75 ton figure is an unrealistic amount. A more realistic figure for wind erosion would be 0 to 15 tons, with the average being near 2 to 3 tons/acre. Under good management systems on irrigated cropland, soil movement by wind can be effectively reduced to 0 to 1 ton/acre. | 2
3. General soils maps, page 2-6, paragraph 8 -- This paragraph should be changed to read, "General soil maps have been developed for existing land uses using the Universal Soil Loss Equation." These soils maps will provide no indication of erosion rates that might occur when land use changes take place. | 3
4. Page 3-4, Land Treatment - The paragraph on land leveling refers to leveling as a scalping process. Quality standards and specifications for land leveling do not permit scalping. Land leveling involves reshaping the surface of the soil to planned grades. Areas where soils are not deep enough to benefit from proper land leveling are generally not leveled. These would be sprinkler irrigated, which generally requires no leveling. | 4

We thank you for the opportunity to review and comment on this draft environmental statement.

Sincerely,

Amos I. Garrison, Jr.
State Conservationist



Mr. William L. Mathews
State Director
U.S. Bureau of Land Management
Federal Building, Room 334
550 W. Fort
Boise, ID 83724

RE: Draft Comments on Soil Classification in Ag-EIS

Dear Bill:

I would like to comment on the interpretation of the classification system and how it applies to the study area. Although I believe the criteria used on classifying soils is excellent, over a more broad area the interpretation derived from that classification would be valid. However, in this particular area, the classification system although accurate has to be interpreted in terms of how it would be applied to the soils of this area. The assumption that Class 1 soils are more productive than Class 2 soils which are more productive than Class 3 soils is a basic assumption. In Appendix 2-2, you indicate that the same soil series occupies Class 1, Class 2 and even sometimes Class 3 lands (Appendix 2-2, page A-18). This table illustrates the problem I have with the interpretation of the classification data. You list different productions for the same soil series in Class 1 versus Class 2 versus Class 3 lands. I believe that there may be, in fact, a difference in production between Class 1, Class 2 and Class 3 lands, but that difference may only appear under agricultural conditions. Under natural precipitation, more forage per acre is usually produced in the draws and in the north and west facing slopes which are probably Class 3 lands because of slope. The areas that occupy the upper benches are flat and level, and subject to drying from the sun and wind.

Although to some degree you have a change in soils between Class 1 and Class 2, an important reason for the Class 1, Class 2 and Class 3 separation in this area is slope. Slope in itself is not a parameter that would cause a soil series to be less productive. The whole analysis of the loss of AUM's and the whole analysis of agriculture production is based on the concept

Letter 55 Response

1-4. The FES has been revised in accordance with the comments.

Letter to Mr. William L. Mathews

June 29, 1979
Page 2

56

that Class 1 soils are more productive than Class 2 soils which are more productive than Class 3 soils. I believe the interpretation expressed in Appendix 2-2 on the economic land classification, page A-8, is an incorrect interpretation of the Class 1, Class 2 and Class 3 soils in the study areas as that classification would be applied to the soils of that area. The production based on classes of soils is one of the basic assumptions in the analysis of the EIS. I contend that the analysis of the loss of AUM's is incorrect. The Class 1 soils may not be the areas of high grazing potential.

The production from the agriculture cropland may again be in error because the production is based on the mix of Class 1 and Class 2 lands. I can see no reason for a soil series to have different production just because you put it into a different classification scheme. Under management, the Class 3 soils may produce equally to the Class 1 and Class 2 soils. Again, I do not understand why one soil can have three different productions under intense agriculture management.

Thus if one assumes that Class 3 soils will be used in the agriculture development, providing they have a suitable slope for farming, then the basic assumption that only Class 1 and Class 2 soils will be used is wrong. Thus, the basic calculation for loss of AUM's, the basic calculation for the production costs and returns, and the basic calculation for the energy demand are all wrong.

Very truly yours,

DARREL W. CLAPP
Chief, Technical Services Bureau

DWC:sjl

A-59, 60

The discussion of downstream hydrolysis methodology is written to discredit Idaho Department of Water Resources' studies rather than to explain methodology. The tone of this section is there are "problems."

2

- 1. Doesn't include data for Lower Salmon. We supplied it to BLM.
- 2. Forty-eight years of generation versus average year. This is a problem?

P. 1-6, 2nd Paragraph

It implies here that the Carey Act is subject to the Federal Land Policy and Management Act, P.L. 94-579. The Carey Act is not subject to the Federal Land Policy and Management Act.

3

P. 1-7, 4th Paragraph

The entryman has only three years to establish development. The state has ten years to get development complete.

4

P. 1-12, 4th Paragraph

Forty psi is usually the actual situation on sprinkler head pressure.

5

P. 1-19, 1st Paragraph

The public laws specified in this section are not applicable to Carey Act.

6

P. 1-21, 2nd Paragraph

Groundwater insufficiency would not necessarily be a criteria to reject the Carey Act. The Carey Act applicant has to determine the source of water.

7

P. 1-21, Last Paragraph

There needs to be a discussion of the five factors that must be considered before a water right is issued.

8

P. 2-88

The flows of the Snake River in the year 2000 would consider anticipated project development.

18

P. 2-88, Last Paragraph

The 2800 cfs diversion for the ES area seems high.

19

P. 2-89, 4th Paragraph

Your 25 cfs and the description in the last line needs further explanation.

20

P. 2-89, 5th Paragraph

This paragraph needs considerable clarification on when, why and by whom.

21

P. 2-90

The section on groundwater needs to be redone.

P. 2-92

The section under "Fisheries", first paragraph. The discussion of Dyke and Wylie should either be deleted or expanded to explain that the impacts of Dyke and Wylie will be considered separately.

22

P. 2-93, Last Paragraph

The discussion of the impacts of anadromous fish should either be deleted or documented.

23

P. 3-1

The item 6 in the "Assumptions", the farmers may not fence out undeveloped land if the Carey Act projects support grazing improvements.

24

P. 3-2, Assumption 11

This seems questionable because most of the existing development out there do not use closed pipe.

25

P. 1-23

Update the discussion on Wiley Dam.

9

P. 1-24

Update the discussions on the Swan Falls-Guffey dams and the Bruneau Plateau feeder canal.

10

P. 2-8, 1st Paragraph

In the first paragraph it refers to 20 dams and 24 dams being proposed. The number is probably much higher, say 340, when you consider all the tributaries to the Snake River.

11

P. 2-10, 1st Paragraph

Although the Thousand Springs does make a significant contribution to the flow of the Snake River, the downstream tributaries contribute more water to the flow of the Snake River than Thousand Springs.

12

P. 2-13, 4th Paragraph

It should be pointed out that the upstream municipal and industrial wastes are upstream from the proposed area in the Ag-EIS.

13

P. 2-15, Last Sentence

The turbidity of the Snake River cannot be attributed to just irrigation returns as this sentence implies.

14

P. 2-17, 2nd Paragraph

This implies that irrigation returns are, again, the reason and the only reason for the increase in turbidity. This is not true.

15

P. 2-85, Next to Last Paragraph

This seems to indicate that four plants equals five.

16

P. 2-84, Table 2-21

This table does not have adequate units.

17

P. 3-15, Next to Last Paragraph

The Carey Act workers would be primarily the farm owners. This is not necessarily true with the Desert Land Entry. Thus, under the Carey Act, the farm workers probably would be more careful in terms of dumping petroleum wastes, pesticides containers and other compounds.

26

P. 3-15, 2nd Paragraph

I wonder how you mix aquifers?

27

P. 3-51

Your discussion on how 14,975 AUM's influences the loss of 41,397 AUM's with a displacement of 127 operators needs to be explained. It is very difficult to understand. When the farmers are going to pay for range improvements, how can this impact be justified?

28

P. 3-58

Under the first paragraph under Carey Act, this 418,580 acres reflects other problems with relative impacts and needs to be explained.

29

P. 3-69

The whole methodology to determine direct consumption has considerable problems. These problems do not allow the exact use of the calculated energy consumption that is used throughout the report. For example, we do know that people are not going to pump water some 14 miles laterally to irrigate land. We know that 600-700 feet of lift is probably much too high with the addition of four to six miles from the water source. Things can be done to keep the direct consumption to a minimum and these practices are generally done out at existing projects in the area.

30

P. 4-1

The Chapter IV on mitigating measures is totally inadequate. There is a lot of things that can be done to mitigate the energy impacts, the wildlife impacts, the historical impacts, and also the impacts on loss of grazing land.

31

P. 5-6

The discussion on economics reflects a method of analysis and cannot be used to determine how much the actual farmer will make.

32

P. 7-1

Your discussion on groundwater supplies declining needs to be further explained.

33

P. 7-2

The part on recreation seems a little ridiculous when you consider the BLM is trying to control recreational use of public lands to then include a number relative to unrestricted recreation opportunities.

P. 7-3

The loss of livestock grazing is not irreversible or irretrievable and probably is not of the magnitude indicated.

34

P. 8-2

Alternative 3 implies that BLM has the option of no Carey Act development.

35

P. 8-3, 1st Paragraph

This paragraph implies that the director does not have maximum flexibility and control over Carey Acts.

P. 8-10

The paragraph titled "Impact Summary", I believe, is supposed to say the state's established flow of 3,300 would not be reached under this alternative.

36

P. 8-14

You have a plant that has no acres, but represents 75 percent of the Idaho population occurring in the ES area.

37

P. 8-63

Table B demonstrates the unusability of the energy demand calculation because of the arbitrary nature in which the analysis was made. It does not take into account specific things that could be done to keep the lifts down and to keep the energy demand to a minimum.

38

P. 8-73

Alternative 3, "No Farm Development", is wrong.

39

P. 8-74

In the section on soils, under the Carey Act the farmers may be required to use best management practices.

40

P. 8-76, 1st Paragraph, Under "Socio-Economics"

The last sentence needs to be couched with the understanding that there is some money that would be returned to the farmer if he did his own labor.

41

P. 8-78

Under "Socio-Economics", you indicated that native desert land would be about \$250 per acre. This seems inconsistent with other appraising, especially in terms of the payment to counties for having land under federal ownership.

42

P. 8-79

Under "Energy", these mitigation of chemical energy impacts could also occur under Carey Act as well as the use of best management practices.

43

General Comments

The groundwater discussions are poorly written. It implies that there is no recharge. They indicate that every acre foot withdrawn is a mining of the aquifer and we certainly do not see that as being applicable. Its a dynamic flow system.

44

The effects on grazing are grossly distorted. It is my belief that many of the animal unit months (AUMs) that are indicated as a total loss could be replaced by use of the litigation money under the Carey Act -- water sources could be developed, other areas could be reseeded or other improvements made that would replace many of these AUMs. For BLM to say that there would be a certain number of AUMs specifically lost because of the land loss and about twice that many would be lost just because of disruption is totally beyond reason. Grazing is a valuable resource and people utilizing the resource would make the effort needed to utilize the resource fully.

45

The EIS uniformly fails to base changes of the environment upon the change from existing natural conditions. It tends to blame the entire

decrease in water quality or air quality upon the agricultural development. It ignores that degradations occur to a certain degree in the natural state, particularly when the "natural" state is already vulnerable and degraded by land use practices that have been less than perfect under the BLM administration.

The tone of the report is routinely negative towards development and as such the BLM attempts to have everything their way. For example, they have indicated that hydro dams will be built in reaches of Snake River because of the need for electrical power and this will hurt the fisheries. Yet, in the next section they will talk about coal-fired plants having to be built and the increase of power costs that will occur. It will be one or the other -- I don't think both will necessarily occur.

46

Letter 56 Responses

1. The soil classification system (Economic Land Capability Class) utilized in this ES was used for agricultural production capability, not native vegetation production. Further, the loss of AUM calculations were not based on the soil classification system. Livestock carrying capacity (AUMs) were based strictly on previous range vegetation surveys that were conducted on public land encompassing the ES area (see Chapter 2 - Livestock). Where land was indicated for farm development under the proposed action, or one of the alternative levels, livestock grazing reductions were estimated for the amount of AUMs attached to the ground to be converted.

There was some concern expressed about the fact that a soil series can span Class I, II and III lands, and that it will produce differently within each class. This occurs quite frequently since the economic land capability classes do not have the same separating criteria as the soil taxonomy system for soil series. For example, a soil series may range in depth between 20 and 40 inches and occur on 2 to 12 percent slopes. At the steepest part of the slope the soil may only be 22 inches thick, where as down hill on 3 percent slopes, the same soil series may be 39 inches deep. This will make a large difference in production and will span all three land classes.

In most soil surveys, the SCS will differentiate identical mapping units on slope only. Each slope class for that mapping unit will generally have different productions. This can be seen in most published soil surveys. The SCS-Soils-5 forms gives the capability and yields based on phases of soil series. Phases are separated according to erosion, slope, or other criteria based on use and management. Table 2-2 was developed using actual SCS-Soils-5's separated into phases of soil series.

- 2. This Appendix has been rewritten for the FES.
- 3. See Letter 7, Response 5.
- 4. The FES has been changed to reflect your comment.
- 5. See Letter 22, Response 8.
- 6. See Letter 7, Response 5.
- 7. Agreed. However, from the BLM viewpoint, a CA proposal could not be allowed if the groundwater supply was insufficient to provide adequate irrigation water. Where groundwater was proposed as the water source, and the supply was questionable, BLM would require a TUP to enter upon the public land for test drilling.

9. The FES has been changed to reflect your comment.

10. The Swan Falls-Guffey dams are not now being considered for construction and the discussion has been dropped in the FES. The FES has been updated regarding the Bruneau Plateau Water Development Project.

11. These figures are taken from Bonneville Power Administration data and were intended to show only "major" structures capable of hydroelectric generation and significant irrigation water storage potential.

12. Agreed. However, the intent here was to discuss the Snake River flows in relation to the study area, not the entire river system.

13-15. The FES text has been changed in accordance with the comments.

16. See Letter 9, Response 4 and 5.

17. In Table 2-21, Column 1 lists the percent of total seasonal electricity or water required for irrigation in each month of the irrigation season. Column 2 lists water diversion in acre-feet per acre per month for the irrigation season.

18. Agree, and is so stated.

19. Agree, the figure is closer to 2600 cfs. FES text has been changed.

20. The assumption that 2500 cfs would be required for 3 months was incorrect. The last sentence has been corrected in the FES.

21. Based on historic trends, it is safe to predict that competition for water resources will intensify. There is an ever-increasing demand from various segments of the public to preserve hydroelectric production, fish habitat, recreation areas, etc. It is also apparent that Idaho's rapidly increasing population will compound these demands.

22, 23. The FES text has been revised in accordance with these comments.

is illustrated in the following example:

111,000 acres @ \$5.00/acre	=	\$555,000.00
Current cost for plowing and seeding per acre	=	25.00

Amount of rehabilitation fund, \$555,000 divided by 25 = 22,200 acres that would be rehabed.

estimated carrying capacity for new seedings	=	5 ac./AUM
total carrying capacity, 22,200 divided by 5	=	4440 AUMs

Thus, only about 1/3 of the minimum lost AUMs could be compensated for. These seeding estimates do not include fencing (\$2000/mile) and water development costs. It is not known if reimbursements for old range improvements would be enough to pay for the new ones that would have to be constructed, but it is not likely.

29. The FES has been revised to clarify the text.

30. The estimations of electrical requirements for the proposed action and alternatives were not meant to depict the exact consumption of a given irrigation project, but rather an estimate of consumption resulting from irrigating the 111,000 acres of the proposed action.

The energy discussion did not rely on one exact estimate of electricity consumption and impact. Two estimations of proposed action electricity consumption was made--one estimating consumption in an "average" year with typical weather conditions and a "worst" case year illustrating drought year electricity consumption.

The farm budget analysis does suggest that the high lifts and relatively long distances from water source are probably too great for profitable farm operation under current economic conditions.

The electricity consumption estimates were generally very conservative. The assumptions used as inputs to the electricity consumption model was based on large cooperative irrigation systems designed for optimal efficiency. Pumps and motors were assumed to operate at peak efficiency over the entire season. The assumed pump and motor efficiencies of 90 percent are very high. The procedures used to estimate pump lifts and distance essentially optimized each acre with the best possible combination. In practice, for a project served by one distribution system, much of the acreage cannot be at the best possible combination of lift and distance.

The water requirement assumption (2.58 acre-feet/acre) is also conservative and could not include conveyance losses for open canals over the relatively long distance required to reach proposed action land. The tradeoffs between closed pipe and canal are discussed further in the response to Letter 22, Comment 9.

24. For the purpose of this ES, and for practical reasons, it is assumed that farmers, including CA projects, would choose to put a perimeter fence around the project and to keep livestock from entering fields. This would be a part of the farm project costs, regardless if compensation money was provided for range improvements for displaced livestock operators.

25. Some of the existing Desert Land Entry projects in the ES study area do use canals. These projects generally have developed large blocks of the best land with terrain suited to canals. Very little of the undeveloped land in the proposed action has such terrain. Some projects have been proposed for proposed action land which would rely on combinations of pipe and canals. In these cases, canal routes are very long and anticipated water diversions are higher than 2.58 acre-feet per acre.

Further discussion of energy tradeoffs between canal and pipe is in the response to Letter 22, Response 9.

26. Accepted.

27. FES text has been modified to reflect the comment.

28. Law requires BLM to reduce a livestock operator's privileges when the public land that he grazes is converted to private ownership. This reduction is by the amount of AUMs that were licensed on that public land. In the case of the proposed action, 14,975 AUMs are licensed on the 148,000 acres (111,000 acres of farm ground plus 37,000 acres of public purpose parcels). These AUMs would be eliminated from 127 livestock operators grazing privileges. In addition, due to scattered farm units and interspersed public land parcels, much of the remaining public land could not be effectively grazed because of herd management difficulties. In the worst case situation, therefore, 41,397 AUMs could be lost in the entire ES area. The worst case situation is doubtful but losses would likely be greater than 14,975 AUMs.

The next thought is how many, if any, lost AUMs could be transferred to other public land outside the ES area. This is a difficult question to answer since there are presently competing demands placed on surrounding public land. Due to the conflicting demands it is not known at this time how many lost AUMs could be picked up elsewhere.

It is possible that range improvement projects increasing the livestock carrying capacity of the land, could be implemented to some extent. Some funds would be available from reimbursements of lost public and private range improvements when farms were put in. State CA regulations require up to \$5 paid to ranchers for each acre of farm land developed. For a 160 acre farm unit this would be \$800. DLA farmers are not required to pay such compensation. Even if all development was by CA compensation would not be enough to create needed grazing forage for the minimum number of AUMs eliminated from the proposed action. This

31. Without question, there are a lot of things that could be done in the way of reducing environmental impacts on the various resources. However, as of now we can list only those types of mitigation that will be committed to, that are legally enforceable and that will be actually implemented on the ground once the proposal takes place. It could be that if and when a decision is made in favor of more farm development, other measures will evolve from the BLM and other entities. At the time of writing this ES, only those mitigative measures listed in Chapter 4 could be committed to.

32. These are the unavoidable adverse impacts only. No methodology is needed or presented because it is referenced in Chapter 3 and in the Appendix.

33. The discussion on declining groundwater supplies is based on hydrograph readings by the Geological Survey. Some wells in the Bruneau area are currently showing declining water tables. Additional withdrawals will cause added declines.

34. Agreed, the FES has been revised to reflect your comments.

35. See Letter 7, Response 5.

36,37. The FES text has been corrected in accordance with the comments.

38. See Comment 30.

39. The title has been changed to read, "Allow No Farm Development."

40. A recent solicitor's opinion states that while the Secretary of Interior can insert terms and conditions designated to insure protection of the environment in construction of reclamation works for a CA project, such terms, such as best management practices, cannot be imposed with regard to farming practices on the land itself.

41. The FES has been revised to reflect your comment.

42. Recent sales of undeveloped native rangeland in the ES area were for about \$250/acre.

43. Best management practices could be used by Carey Act developments to keep chemical energy consumption to a minimum. There is, however, no means to insure that such practices are followed under an alternative where the land is transferred to private ownership. See response 40.

44. The text does not imply there is no recharge. Recharge will occur and, in some instances, raise water tables. The final result, however, is a predicted net withdrawal of groundwater and an accompanying lowering of water tables. This is what is meant in the text.

45. See Response 28.

46. The most recent Idaho Power Company forecasts, made in 1977, include new coal fired generation and Wiley and Dike dams. Idaho Dept. of Water Resources previously proposed joint State, Idaho Power Co. financing of Wiley and Dike. Both new hydroelectric facilities and coal fired plants will increase power costs.*

*IPUC Case # U-1006-137; Testimony and Exhibits of IPC witness Barclay.

Letter 57 Response

1. There would be an increase in heavy truck traffic on the State and Federal Highway System if the proposed action were implemented. Based on the development of approximately 111,000 acres of agricultural land it was determined by the Idaho Transportation Department that the capacity and design of the existing State and Federal Highway System is sufficient to accommodate the increased truck traffic without additional traffic lanes. In addition to capacity it is important to analyze the effects of additional heavy truck traffic on the design life of the existing roadway as well as increased maintenance. Fifty three segments of U.S. Highways 95, 20, 30, 93, I-80N and State Highways 19, 55, 45, 78, 51, 50, 27 and 25 were studied. With the exception of short segments of State Highways 78, 51, 27, 25 and U.S. 30 there would be no significant effect of the proposed action on the design life or acceleration of maintenance costs on the highway system. The short segments of highway identified above have little or no current heavy truck traffic—the introduction of this traffic would cause a small increase in maintenance on these segments and a minor shortening of design life. The costs of this additional maintenance would be offset, to some extent, by increased fuels tax revenue collected from the fuels required to operate more heavy trucks.

In summary, there would be minor reductions of design life on a few specific segments of the system as well as a minor increase in the maintenance of these segments. Generally the effects of the proposed action on the State and Federal Highway System would not be significant.



U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION TEN
412 Mohawk Building
222 S. W. Morrison St.
Portland, Oregon 97204

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Consulting Associates, Incorporated

BOISE OFFICE
VERNON BAVENCKROFT
HELEN GREENWICH

PHONE (208) 348-2870
P.O. BOX 883
BOISE, IDAHO 83701

58

July 6, 1979
IN REPLY REFER TO
HED-010.6

July 6, 1979

District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho

U. S. Department of the Interior
Bureau of Land Management
550 W. Fort
Boise, ID 83702

Dear Sir:

Attn: Mr. William Matthews
State Director

The Federal Highway Administration, Region 10 has reviewed the DEIS for S W Idaho, Boise District Agricultural Development and offer the following comment for your consideration:

Dear Bill:

The discussion of transportation system impacts addresses the need for new roads if agricultural development takes place. The effect of the development on the existing State and Local road systems should also be addressed.

I was not able to attend your EIS hearings (in relation to further land development) at Murphy, Boise, and Twin Falls. At the time I was recovering from major surgery and was not able to travel. I now find that the time for written comment is also past, but I would hope that some factual material might be accepted and made a part of the final record.

Sincerely yours,

Richard C. Cowdery
Richard C. Cowdery, Director
Office of Environment and Design

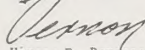
I am writing as executive chairman of the Idaho Carey Act Development Association. Our membership is composed of interested potential Carey Act projects from all of Southern Idaho. A number of our most active members represent projects which are situated within the EIS study area. Of these projects, there are five which have completed their feasibility studies, feel that they can re-instate previously approved financial backing, and desire to move ahead at the earliest possible date. The five are:

	Gross Acres
Narrows Water District	8,246
Kevan Carey Act Project	655
Robert Skiles Project	1,339
Rim View Project	640
Reem Association	640
TOTAL Approximate Gross Acres	11,320

There are other projects which are within or partially within the EIS area. If subsequent contacts reveal that any of these have now completed their various arrangements to where they also are anxious to obtain authority to proceed with settlement, I will so advise in a separate follow-up letter. There are also additional other serious projects in the general Southwest Idaho area, but these are involved in the Birds of Prey question or are outside these two study areas (EIS and Birds of Prey). As such, they too will be the subject of later action by our association.

The long-range land development policies considered by the EIS were adverse to anything but the very best development prospects. The latest inflated energy costs were calculated against the current depressed agricultural prices. There are strong indications that the agriculture price cycle is now turning around and this season's prices may be up from 20% to 40% above last year. Secondly, the state of Idaho has authorized a feasibility study for the Bruneau Plateau gravity irrigation project. If this concept is practical, then the energy and cost assumptions made by your EIS study are out of date, inadequate, and therefore not applicable.

Sincere personal regards,



Vernon F. Ravenscroft
Executive Chairman
Idaho Carey Act Development
Association

VR:sh

cc: Steve Allred
Elaine Martin

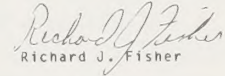
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fish species in any proposed action. By planning for their conservation, possible last minute project modifications and delays could be avoided in the event the species are listed or the amendment passes.

Water withdrawals for the Boise District Agricultural Development would adversely affect anadromous fish populations in the Snake and Columbia Rivers downstream of Hells Canyon Dam and would limit the effectiveness of anadromous fish management efforts.

The Fish and Wildlife Service would be opposed to any activity producing an incremental reduction in anadromous fish habitat.

Thank you for the opportunity to comment on this document.



Richard J. Fisher

cc: Regional Office, Portland
Area Office, Boise
OEC, Washington, D. C.
IDFG, Headquarters
IDFG, Region 3
NMFS, Portland



United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
4620 Overland Road, Room 209
Boise, Idaho 83705

59

July 13, 1979

TO: District Manager, Bureau of Land Management,
Boise

FROM: Field Supervisor, ES, Boise

SUBJECT: Boise District Agricultural Development Environ-
mental Impact Statement, Reference 1792
(EC 79/23)

These comments supplement our June 19 memorandum on the subject draft EIS. Please consider both memorandums our official response on the document. We re-emphasize that the draft statement coverage of the impacts on the resources downstream of the project should be in more detail. Our significant concern is the impacts of flow reductions on anadromous fish and their associated habitat downstream of Hells Canyon Dam.

More information should be presented on the effects of reduced flows on anadromous fish passage, spawning, incubation and rearing. One or more of these activities occur every month of the year in the Snake River downstream of Hells Canyon Dam. Reduced flows during any of these phases of activity would severely impact this resource.

High mortality of adult salmon and steelhead trout migrating upstream and of smolts migrating downstream occurs at downstream barriers due partly to insufficient instream flows. Affected are all life stages of spring and fall chinook, and summer steelhead; and adult and smolt stages of summer chinook and sockeye. Anadromous fish runs in the Snake River have declined to the point where spring, summer and fall chinook and steelhead trout are presently being evaluated for possible listing under the Endangered Species Act. Although formal consultation is not presently required on candidate or proposed threatened or endangered species, such an amendment is now being considered in Congress. It would be a definite advantage to BLM to fully consider these

Letter 59 Responses

1. Accepted in part. See response to Letter 20, Comment 22 which show that at Anatone, above the mouth of the Clearwater River, the mean flow reduction caused by the proposed action would be 0.45 percent for April, 0.74 percent for May. Also see response to Letter 9, Comment 1, and Chapter 3 - Downstream Fisheries.

Of themselves the flow reductions in average years in the lower Snake River caused by the proposed development would not pose a measurable threat to anadromous fish resources or to water quality. As noted in the response to Letter 9, the cumulative reductions in flow caused by this and other possible withdrawals do pose serious threats to anadromous salmonids.

As a further note, it should be stated that the only anadromous salmonid species spawning in the Snake River downstream from Hells Canyon Dam is a remnant run of fall chinook (about 1000 to 2000 fish passed Lower Granite Dam in recent years). During the incubation season (November-March), flows would be unchanged in November and very slightly increased in the period December-March (maximum increase would be 0.1 percent) as a result of prolonged return of irrigation flows as groundwater. There is little or no rearing by anadromous salmonids in the Snake River from Hells Canyon Dam to the mouth. Hence, the only matter of possible concern is the effect of reduced flows on migrations of juveniles and adults. There is no evidence that flow reduction in average-flow years equal to less than one percent can have a measurable influence on either juveniles or adults. In a low-flow year such as 1973, the April and May flow reductions would be 0.8 and 1.1 percent, respectively. It is difficult to anticipate any measurable effect of even these reductions on either water quality or survival of migrating salmonid juveniles. A calculated 5 percent flow reduction in September of 1973 would be unlikely to produce measurable impacts on upstream migrants (fall chinook and steelhead), especially below the mouth of the Clearwater River (which would ameliorate the effect of the 5 percent reduction at Anatone). It is remotely possible that fall chinook adults would be delayed very slightly in a low-flow year in their passage through the reach above Lewiston in September. In October of 1973, the effect of the proposed action would have been a flow decrease of 0.4 percent, which would not have affected adult migrations.



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316 Fifteenth Avenue So., Nampa, Idaho 83651
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TELEPHONE 208 / 343-3743 466-4152

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June 8, 1979

District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Idaho Consumer Affairs, Inc., by its Utility and Natural Resources Committee, Chairman, Mr. Harold C. Miles, 316 Fifteenth Ave. South, Nampa, Idaho 83651 wishes to present the following preliminary testimony regarding the Bureau of Land Management's Boise District Agricultural Development Draft Environmental Statement for Southwest Idaho.

We wish to thank the BLM for the opportunity to appear and express our views regarding this very important issue now before all the citizens of Idaho, and the rest of our Nation as well. In addition, we wish to congratulate the BLM for the very thorough and appropriate manner in which this Draft Statement was prepared, as well as the accuracy and validity of its assumptions, altho there are points which may need clarifying before the Final Statement is prepared.

There is the feeling by a number of our members, that altho agriculture in Idaho, including cattle raising, may still be the State's largest industry, it is also one that is steadily declining, and with the exception of War years, agriculture in Idaho has always been a marginal and residual business. The facts and figures submitted in the Draft seem to bear this opinion out, and the following

We Care About You

(1)

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Testimony of Idaho Consumer Affairs, Inc., presented by Harold C. Miles regarding Boise District BLM's Draft S.W. Idaho's agri-development. general statements and opinions are offered in support of our position.

1. It does not appear to us the actual need for the proposed development of 111,015^{acres} of additional public lands for the production of agricultural crops, which are not being marketed at a satisfactory profit at this time, but quite possibly at a loss, is very prudent; especially when the increased production of agricultural crops from this land will put additional pressure on the crops being now grown, as far as volume and price are concerned. Also, the fact that as of May 1, 1979 over three times the proposed acreage for development, 379,363 acres, were set aside for the calendar year 1979 (preliminary figures), and for the calendar year 1978 the actual set aside acreage in Idaho was 2,332,139 acres. It is recognized a considerable part of this acreage was from dry farm land, nonetheless crops produced on additional irrigated land will have a great impact regarding quantity and price on agricultural crops already being produced whether from dry or irrigated farm land. The proposed addition of 111,015 acres will negate the benefits derived presently from set-aside programs. (See exhibit one pages 1 & 2). In addition, these pertinent facts should be noted and included in the final draft as well as the fact that from the calendar years of 1965 thru 1974 inclusive, nearly four hundred million dollars, (\$376,884,040) were paid under some form of a farm subsidy program in Idaho. These subsidy programs did not help decrease the national debt, and it is our view that increasing the agricultural production in Idaho, when there is a surplus of product, for which prices remain depressed, not only in Idaho but other areas of our Nation as well as other parts of the world, will only compound the already serious agricultural problem. (See exhibit one page 3).

2. The actual net profit that may be expected to be received from a Carey Act family farmer does not appear to be very great.

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Testimony of Idaho Consumer Affairs, Inc., presented by Harold C. Miles regarding Boise District BLM's Draft S.W. Idaho pro. agri-development.

In fact, if we may refer to table A-55 for a 320 acre farm, 310 acres under irrigation, which we assume to be a Carey Act project, for the calendar year 1976 under a profit computation for normalized prices, the net profit for this 310 acres, actually farmed, was \$4,141.72 from a total income of \$158,488.63. Yet looking still further from page A-51 we can see that the income from this same size farm in the year 1977, under the most favorable scenario, normalized prices, was \$141,126.40, or a decline of \$17,362.33, which if even the operating expenses for 1977 were the same, which in view of inflation, we are quite sure they were not, the net income would appear to be a minus \$13,220.51 plus an averaged tax payment of \$9.07, per acre, (page A-58)

for the full 320 acres or \$2,902.40 added to the \$13,220.51 income deficit already mentioned leaves a total income deficit of \$16,122.91 for the the calendar year 1977. From what we read in the papers it would appear that due to further depressed farm commodity prices and increased expenses the prospects for a much better profit picture for the present or future farming of this high lift pump irrigated farm land isn't too good, and rest assured the general public will strenuously object to paying crop subsidies or other types of farm subsistence payments on unneeded farm land.

3. Another aspect of this proposed agricultural development is the severe damaging effect this additional proposed high lift irrigation development will have on the Idaho based cattle raising industry, which historically was established in this geographical area of Owyhee, Elmore and Twin Falls counties long, long before high lift pump irrigation was ever heard of. We feel that the cattle industry, which is just now coming out of a severe period of financial difficulty, and has historically not asked for any subsidy payments, other than quite reasonable grazing fees and range improvements, should not have its grazing areas reduced, inasmuch as

(3)

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Testimony of Idaho Consumer Affairs, Inc., presented by Harold C. Miles regarding Boise District BLM's Draft S.W. Idaho pro. agri-development.

it appears to be vitally necessary for a successful cattle operation to have close-by leased BLM rangeland for cattle grazing to supplement the deeded land held by the cattleman or the cattle operation, itself. To deprive 127 cattle operators of valuable rangeland necessary for them to continue to operate their cattle operations profitably will not benefit the general public in Idaho as a whole, inasmuch as to continue to operate profitably and increase the herd numbers, they must continue to hold this rangeland, in question. To do so will have the beneficial effect of lowering beef prices due to increased numbers of cattle being able to be marketed. At least it will hold the price increases in check better in the future. To us, there is a difference between increasing a marketable supply and increasing a considerable surplus for an unprofitable market.

4. There are many who hold the view, which we share, that the best solution for solving food shortages in Third World countries lies in a program in teaching the rural men and women in these countries, simple, efficient, innovative agricultural techniques, or aiding other countries to help themselves instead of depending upon help from the developed countries, such as the United States. In the past, too much food has been shipped, using valuable critical petroleum to power the ships, of a kind that the recipient country did not use, wheat instead of rice, for example, and the food has lain at docks and rotted because of lack of adequate transport, or has been sold by the corrupt politicians. These food products have not reached the people for whom it was intended, until an excessive price was paid, and the corrupt politicians pocketed the money. In short, these developing countries will have to make investments of their own in improving their transportation systems, storage facilities and the development of their rural districts, thereby enabling the people, in the back areas of these countries, who are the most impoverished, to better feed themselves.

(4)

5. We feel the quite severe impacts on the wild animals, non-game birds, as well as raptors, and even the game birds, some of which are anticipated to increase for which we have serious doubts since the water supply does not appear to have been properly considered, is not justified by this proposed irrigation project. In addition, the increased land erosion does not seem to be properly mitigated for, as well as the unneeded disturbance of the native plant life and the loss of a considerable part of the aesthetic beauty of the Snake River canyon itself due to the construction and installation of the many high lift pumps and power lines.

6. The further reduction in the flow of the Snake River, as has been pointed out many times, including this Draft, for the proposed agricultural development in Southwest Idaho, can not have but a very serious if not a disastrous effect on the generating capability of the Idaho Power Co's Hydro generating stations, now operating. The result of the projected increased demand on Idaho Power's system for increased generating capacity, will be caused primarily by proposed new pump irrigation projects, especially the high lift ones of 250 feet or more. The proponents and sponsors of these projects are most reluctant, if not adamantly opposed, to paying the incremental costs of building these new plants, which will be much more expensive to build than were the plants now operating, which I am sure All will agree. However, since no one is being trampled in the rush to volunteer to pay the full incremental costs for building additional plant capacity, it must be assumed the costs for New plant will be incorporated into a system average price for generating this electrical power, resulting in a very marked increase in the cost per kilowatt hour to All classes of customers of the Idaho Power Co. As stated, no one is voluntarily requesting to have his electrical rates increased, at least without a

(5)

Testimony of Idaho Consumer Affairs, Inc. presented by Harold G. Miles regarding Boise District BLM's Draft S.W. Idaho pro. agri-development. compensating factor, and in view of All the information published and discussed in the various news media as well as the testimony on record in the various stages of the Pioneer Coal Fired Generating Plant hearings as well as the recent Idaho Power Rate Case hearing Case U-1006-140-117, several prominent farmers testified that they and irrigators as a whole could not stand a large increase in their irrigation class electrical rates and still operate at a profit. (Judicial notice is requested to be given these proceedings).

The Idaho Power Co. filed with the Federal Energy Regulatory Commission information showing in their "Hydroelectric Generating Stations Cost Analysis" that the actual average cost in the calendar year 1978, for their hydro system to generate electricity, was 5.62 mills per kilowatt hour, (See exhibit No. two page 2), whereas the cost of new Thermal generation, at their new proposed generating plants, averaged, will be well over 30 mills.

7. The 1978 Form 1 annual report of IPCo. to the FERC states that the residential rate was 21.1 mills per KWH, and the April 1979 IPCo Bulletin to their customers is bannered, "Idaho PUC Grants Co. Rate Increase," which was 14.3%, and it can be stated with certainty that there will be substantial increases for electricity in IPCo's service area in the future for all classes of customers. The Dames and Moore energy study prepared for the Idaho Public Utilities Commission projects the cost of electricity for the residential class of IPCo's customers in 1992 to be 71.1 mills per Kwh. (page 85-table 27). Therefore, we support Alternate #3, to allow No development, reject all existing DIA and CA applications and impose a moratorium on all further filings inasmuch as All the other alternatives plus the proposed action would develop public lands which can serve other uses better, and to do otherwise would impose an unwarranted financial burden on over two hundred thousand customers of the Idaho Power Co., for

(6)

Respectfully submitted,

IDAHO CONSUMER AFFAIRS, INC.

Harold G. Miles
by: Harold G. Miles-Chairman
Utility and Natural Resources Comm

P.9. We would like to comment upon one statement regarding the supply of Natural Gas now, and in the future, referenced on page 7-4 of this Draft, to state that recent projections of the Department of Energy state that the supply of Natural Gas is adequate well into the 21st Century, and is environmentally clean, whereas the burning of coal, while there is an apparant abundant supply, is also a finite energy source, and is considerably more environmentally damaging as far as both human, animal, and plant life are concerned, not to mention air quality. The cost to the consumer for electrical space heating will be more than natural gas, in the Idaho market, all considerations being equal.

(7)



May 16, 1979

Mr. Harold C. Miles
316 15th Ave. So.
Nampa, Idaho 83651

Dear Mr. Miles:

We are submitting the following preliminary figures for the 1979 program year as requested in your letter of May 11:

Preliminary Figures

Wheat	-	243,843
Barley	-	133,564
Corn	-	1,956
Total		379,363

Hoping this will give you the information needed.

Sincerely yours,

Harland K. Blackburn
Harland K. Blackburn
State Executive Director
Idaho State ASCS Office



UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE
 304 North 8th Street - Room 149
 Boise, Idaho 83702

February 27, 1979

Mr. Harold C. Miles, Chairman
 Utility and Natural Resource Committee
 Idaho Consumer Affairs, Inc.
 316 - 15th Ave. So.
 Nampa, Idaho 83651

Dear Mr. Miles:

The following 1978 information is being supplied as requested by your recent letter.

Final set-aside acres for the following crops was as follows:

Wheat - 1,130,322 acres.
 Barley - 972,377 acres.
 Corn - 39,440 acres.
 Total 2,332,139 acres set-aside

There was no set-aside payment for wheat. However, there was a haying and grazing payment for wheat that amounted to \$141,420 on 8,805 acres.

The set-aside payment for barley and corn was only made on an additional 10 percent set-aside over and above the required original 10 percent set-aside. This amounted to 166,904 acres for barley and a \$1,114,779 payment, and for corn 3,721 acres and a payment of \$79,436.

For your further information, we are enclosing pamphlets explaining both the 1978 and 1979 wheat and feed grain programs.

We have no way of knowing what the set-aside acreage for 1979 will be until after the 1979 program year is over.

Sincerely,

Harland K. Blackburn
 Harland K. Blackburn
 State Executive Director
 Idaho State ASCS Office

enc:

IDAHO POWER COMPANY
 Hydroelectric Generating Stations Cost Analysis
 (Excluding step-up stations at power plants)
 For the Year of 1978
 (\$000's)

Description	Rate Base	Amount
Electric Plant in Service		\$297,606.2
Less:		
Accumulated Provision for Depreciation and Amortization		38,826.7
Net Plant Investment		258,779.5
Working Capital:		
Working Cash		724.8
Materials & Supplies - Operating		61.6
Total Working Capital		786.4
Total Electric Plant Rate Base		\$259,565.9



UNITED STATES DEPARTMENT OF AGRICULTURE
 AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE - WASHINGTON, D.C. 20250

APR 2 1975 (Apr. 2, 1975)

Honorable Steven D. Symms
 House of Representatives

Dear Mr. Symms:

This is in reply to your recent letter with which you enclosed a request from Mr. Harold C. Miles of Nampa, Idaho for amounts paid under farm subsidy programs in Idaho with names and addresses of the recipients.

The total amount of Agricultural Stabilization and Conservation Service program payments in Idaho by calendar year are shown below.

1965	\$29,058,000	1970	\$47,951,764
1966	37,579,369	1971	45,106,488
1967	37,059,593	1972	51,067,074
1968	39,893,882	1973	31,931,443
1969	46,085,681	1974	11,150,726
	TOTAL		\$376,831,700

The amounts listed above represent payments for participation in any or all ASCS programs. These include production adjustment through 1973, disaster payments in 1974, conservation of natural resources, wool and sugar subsidy programs, and milk and beekeepers indemnity programs.

During calendar year 1973, there were 11,154 payees in Idaho who received \$500 or more for participation in ASCS programs. In calendar year 1974, there were 4,128 payees receiving \$500 or more. A listing of payees receiving \$500 or more has not been prepared at the State and National level.

Honorable Steven D. Symms

ASCS and Great Plains program payments of \$5,000 or more, excluding loans, was prepared for calendar year 1973. We are enclosing a copy of this report for Idaho. Changes in farm programs administered by ASCS have resulted in a drastic reduction of payments to producers. Consequently, there are no plans to prepare a listing of large ASCS program payments for calendar year 1974.

Lists of producers' names and addresses are not available to the general public under the invasion of privacy exemption in the Freedom of Information Act, unless such lists are prepared specifically for publication as in the case of the enclosed 1973 listing.

Sincerely,

James H. Bliniddle
 James H. Bliniddle
 Director, Data Systems Division

Description	Rate Base	Amount
Total Rate Base		\$259,565.9
Less: Deferred Income Taxes		19,014.5
Net Rate Base		\$240,551.4
Cost Analysis:		
Return at 9.30%		\$ 22,587.8
Depreciation		2,752.5
Income Taxes		11,467.1
Ad valorem Taxes		3,582.5
Other Taxes		1,408.9
Insurance		401.8
Operation & Maintenance		4,355.4
Administrative & General		1,041.0
Rent Paid		112.1
Rent Received		(54.8)
Total		\$ 47,654.3
1978 Actual Generation		8,473,189 MWH
Average Cost per kWh:		5.62 Mills
Median Generation		7,485,456 MWH*
Average Cost per kWh:		6.37 Mills

*FERC Form 12 - 1977
 (Subject to change due to new water study)

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IDAHO POWER COMPANY
Cost of Capital Determination
Actual 1978

Capitalization	Amount	Ratios	Cost	Weighted Co
Long-Term Debt	\$432,679,061	49.519%	6.829%	3.382%
Preferred Stock	61,500,000	7.038	7.205	0.507
Common Equity	304,768,741	34.880	13.500	4.709
Short-Term Debt*	<u>74,823,548</u>	<u>8.563</u>	<u>9.293(1)</u>	<u>0.796</u>
Total	<u>\$873,771,350</u>	<u>100.000%</u>		<u>9.394%</u>

*Average daily balance for 365 days.

(1) Effective interest cost on short-term debt for borrowings throughout 1978.

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

61

In Reply Refer To:
OEPR-DRB
Cooperative Studies
Environmental Impact Statement

JUL 27 1979

Mr. Dean Bibles
District Manager
Bureau of Land Management
230 Collins Road
Boise, Idaho 83702

Dear Mr. Bibles:

The Federal Energy Regulatory Commission staff has reviewed the Boise District Agricultural Development Draft Environmental Statement for Southwest Idaho. The following observations and comments are presented for your consideration.

The proposal analyzed in the draft environmental statement (DES) involves the conversion of 111,015 acres of public land within the BLM Boise District to irrigated farmland by 1984. In addition, about 37,000 acres of public land would be reserved for public purpose needs associated with agricultural land uses. The proposed development would require diversions of 250,004 acre-feet of water from the Snake River per season.

According to the DES, these irrigation diversions would result in an average annual loss of 148,104 megawatt-hours annually of hydroelectric generation at the Idaho Power Company's (IPC) downstream dams. The report also states that the total load on the IPC system that would be created by the proposed action, including downstream hydroelectric power losses and pumping requirements, was estimated at an average of 556,661 megawatt-hours annually. The Idaho Power Company would have to provide 200 to 240 megawatts of electricity during the average peak irrigation month of July for pumping needs alone and that this block of electricity would require additional generating facilities, most likely fossil-fueled steam-electric, and raise the rates for all customer classes.

In addition to impacts on IPC's system, the DES states that irrigation diversions of the proposed action would result in losses of hydroelectric generation at Federal dams on the Snake and Columbia Rivers. These losses would average 154,779 megawatt-hours annually for each irrigation season. The DES also states that four potential low-head hydroelectric dams are currently under

Letter 60 Response

1. It is not known if crop production from the proposed action would compound the nations agricultural problems. When the scale of the proposed production is measured against national production, the former seems negligible. A direct relationship between national (or even local) production and price cannot be established because there are so many variables, such as international demand, that influence price. It is true that huge sums of money are paid in agricultural subsidies. Over \$50 million was paid to Idaho farmers in 1979. In theory, it could be assumed that subsidies will rise as acreage increases, and prices will fall as production increases, but this cannot be completely substantiated in fact. An analysis of potato prices in chapter 3 - Economics predicts a decline in potato prices of \$.07 to \$.09 per hundred weight if the proposed action were implemented. Most experts agree this is of questionable validity and that the influence on other crops would even be more difficult to evaluate.

study in the reach of the Snake River which flows through the study area. These dams would have low storage capacity and would be used principally for run-of-river hydroelectric power generation. If constructed, these low-head dams would help meet increased electricity demand created by new irrigation pumping resulting from the subject agricultural development and could irrigate much of the public lands within the study area.

The following comments are made in accordance with the National Environmental Policy Act of 1969. Our principal concern with the proposals affecting land and water resources is the possible effect on bulk electric power facilities and existing and potential hydroelectric development, and on natural gas pipeline facilities.

FERC's Licensing Authority

The Idaho Power Company's dams discussed in the DES are under license by the Federal Energy Regulatory Commission (FERC). The FERC issues and enforces licenses for non-Federal hydroelectric power facilities. IPC's projects that are affected are identified by FERC Project numbers as follows: Hells Canyon, Oxbow, and Brownlee--Project No. 1971, Swan Falls--Project No. 503, C.J. Strike--Project No. 2055, Bliss--Project No. 1975, Lower Salmon--Project No. 2061, and Upper Salmon--Project No. 2777. The FERC has no authority, however, to regulate or assure streamflows to its licensed projects except to regulate flows from the FERC licensed projects.

Hydroelectric Power Generation

The future development of small scale hydropower resources, as discussed in the DES, could provide up to 312 MW of generating capacity to meet irrigation pumping requirements of the proposed project's lands, and would mitigate the project's adverse impact on existing hydropower generation.

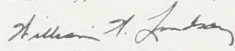
Natural Gas Matters

Only one natural gas pipeline company is known to be operating within the 111,015 acre of public land to be developed for farming under the proposed action. El Paso Natural Gas Company, a Federal Energy Regulatory Commission jurisdictional company, operates one 16-inch and one 22-inch diameter pipeline in Elmore, Owyhee, and Twin Falls Counties, the three counties involved in the proposed project plan.

Examination of information as of August 1978, reveals no oil or gas production within the proposed agricultural area. Additionally, there is no indication of any exploratory or development drilling. However, as the DES indicates, existing oil and gas leases cover approximately 21,550 acres within the area. If oil and gas resources are discovered on these leases, extraction could be accomplished without significantly affecting the proposed agricultural use of this land.

We hope our comments will be helpful in the preparation of the final environmental statement.

Sincerely,



William W. Lindsay, Director
Office of Electric Power Regulation

The following section displays the substantive comments that were identified from testimony given by 42 individuals at the public hearings. These substantive statements or questions given at the public hearings have been quoted. The response immediately follows each comment.

Commenter Number 64

(a) Comment: "A point I would like to briefly address is the fact of the quoted loss in grazing this projected development would have on a particular area. The limiting factor in the large area of that area is water, whether it's livestock water or water for farming. With the water available up there through the farming operations, I feel -- I don't have any facts to back that up -- but I feel the water would be available for livestock water from the projects, if anything, there would be an increase even with the acres taken out and the amount of livestock that could be handled in those particular areas. This is not even taken into account or effect in the aftermath uses that could come from crop residue on these particular projects in the fall, early winter grazing on these particular lands."

You gentlemen are familiar with the Bell Rapids Project. And one point in fact you can see that there is a sizable amount of grazing in the fall, early winter on grains and cereal type grains and alfalfa on this particular project. And I might have missed it in the statement, but I saw no indication of any increased grazing capability because of development of the ground."

(a) Response: There would be some opportunities for new stock water development and distribution created if DLA and CA farm expansion resulted in the ES area. This could result in a reduction in magnitude of livestock grazing cuts. However, there are no requirements in the DLA and CA authorities that would require entrymen to provide these water developments and the water for livestock uses. It is impossible to predict if and where water might be provided from new farm projects to enhance grazing.

In talking to the Elmore County Extension Agent, grazing of aftermath does not provide any significant amounts of livestock forage. One large desert entry project, Grindstone Butte, does not allow livestock to graze aftermath on its farmlands. Also see response to letter 49, Comment 1.

Commenter Number 65

(a) Comment: "On the map labeled 1-3 titled Agricultural Development Status as of January 1, 1979, you have shown lands listed

for private exchange. We feel that this land would properly be listed for Carey Act development only as the filing was made in 1974 under Narrows Phase II. This land was requested for reclassification for Carey Act release, and the matter is being held by your land board for rehearing pending the completion of litigation. With the decision handed down by the Ninth Circuit Court in April, we believe that the land can only be released for Carey Act and that the 1976 application for exchange is totally invalid because of the withdrawn state of the lands in question."

(a) Response: Map 1-3 has been modified in the FES to eliminate the private exchange status. The exchange transfer is one proposal only and is a future option that may be considered. Carey Act and desert entry are also land transfer possibilities. At present, the land is under withdrawal status which precludes any form of disposition from federal ownership. Until the withdrawal is revoked, this land cannot be farmed under CA or any other authority.

(b) Comment: "We feel that your proposed release acreage figures of 111,000 acres are a fair figure even though it does not cover 100 percent of the 16 Carey Act projects filed on. But we must drastically disagree upon the minimum acreage release figures and lands. We firmly believe that in the light of the current court decision, all Carey Act lands should be listed in the minimum release area. Should that not be possible, then lands lying closest to the river should be the only lands listed for release in the minimum release area. Lands in this area had to meet the 500 foot lift criteria to be listed in your minimum release area, but no thought was given to the power usage, development costs, or simply how they would get water to these isolated regions more than five miles from the river. I have brought a few figures dealing with one of the largest discrepancies for you to look over. In this case, approximately 6,000 acres of land in the B&H project in Township 7 South, Range 9 East is listed for release because the land is below the lift cutoff. Yet the feasibility study has been completed on this land, and they have found that to feasibly irrigate their 15,000 acres project they will pump water to the 600 foot level into a canal that will be owned by the Narrows Water District. The water will then flow south four and a half miles before going into a fully pressurized system for release to the B&H project applicants. The land that the water will flow across was not allowed in the minimum release area because of its lift even though its horsepower usage would only be about 80 percent of the B&H project for the same amount of acres if Table C on page A-64 were used to figure the horsepower requirements."

(b) Response: Table C displays electricity consumption under "worst case" weather conditions. Table B, page A-63 displays electricity consumption for average case conditions.

With all other factors being equal, a lift of 600-700 ft. and 0 horizontal distance would require less electricity (2937 KWH/acre) than a lift of 500-600 feet with a horizontal distance in closed pipe of 4-6 miles (3148 KWH/acre).

Pumping 600-700 feet into a canal of 4-6 miles is not directly

comparable in the example, because additional water requirements to make up for canal evaporation and seepage are not taken into account.

The tradeoff between canal and closed pipe are further discussed in the response letter to Comment 22-#9.

The assumptions and procedures used to distribute acreage into lift and distance parcels to estimate the electricity requirements for the 111,000 acres of the proposed action were not meant to model the electricity requirements of specific projects on specific relatively small tracts of land that may be able to take advantage of special circumstances of terrain or the location of existing canals, etc. Such special conditions are not typical of the proposed action as a whole and could not be taken into account with any accuracy in the analysis. The procedures used for distributing acreage by list and distance did generally assume an optimum combination of list and distance for all acres in the proposed action and alternatives. However, the example cited in these two comments could well be correct for the specific tracts of land discussed.

(c) Comment: "We realize that you had to establish some criteria for determining power usage, but feel that the usage of completely pressurized systems overestimates the power need for new development. People farming these projects do not want higher electricity costs either. We have designed systems using gravity flow open canals and other power saving features."

(c) Response: The trade off between canals and closed pipe are discussed in responses to letter 22 Comment 9 and letter 56, Comment 25. Other assumptions relative to electricity consumption are discussed in response letter 56, Comment 30.

Commenter Number 66

(a) Comment: "We feel compelled to make a statement about the environmental draft on the basis that the draft seems to indicate that the amount of land development, if any, is tied directly to the cost of electricity and that the cost of electricity is the overriding consideration of whether development will take place. The company's basic philosophy as to how much, if any, of the land should be developed agriculturally is that it isn't for the company to decide but rather for the people of the area to make that choice."

(a) Response: The cost of electricity is not the only critical factor in determining the amount of land developed. Electricity cost is, however, a major consideration to the developers of new land and to the ratepayers of Idaho Power Company who will bear most of the cost.

With the high pump lifts and long distances from the water source, the cost of electricity becomes an important variable in determining the profitability of new land development. The electricity necessary for high pump lifts and long water transport distances is the principal

economic difference between the proposed action land and existing irrigated agriculture in South Idaho. The economic viability of the proposed action land in comparison with existing land is therefore extremely sensitive to electricity costs.

The increase cost of electricity to IPC ratepayers resulting from meeting the electricity demands of new irrigation development is one of the major impacts of the proposed action. Assuming that the general public in South Idaho will have the power to decide whether more land is irrigated or not, the impact of increased electricity rates will be one of the major factors in that decision.

Although the comment indicates that the question of how much, if any, land is to be developed "isn't for the Company to decide", IPC policy is clearly a crucial determinant in agricultural development in South Idaho. IPC policy in three main areas could determine whether the proposed action is physically or economically feasible:

I - The first area is water rights and water availability. As discussed on page 2-78 of the Draft Environmental Statement, a complaint by a citizens group is before the IPUC (pending as of October 1979) alleging that IPC has water rights for power production that are senior to agricultural rights but that the company has been negligent in protecting these rights to the detriment of ratepayers. In response to the complaint, IPC has filed suit against the Idaho Department of Water Resources and others in the Idaho District Court for Ada County seeking a declaration of its water rights. As of October 1979 this suit had been before the court for over 20 months, during which time IPC did not press the court for an early resolution of the question. Meanwhile, also in response to the complaint, IPC has instituted a moratorium on new irrigation hookups that would affect Snake River flows, and this moratorium has been upheld by the IPUC.

The resolution of the complaints before the IPUC and the ruling of the court on IPC water rights could be a deciding factor in the future availability and cost of Snake River water for agricultural development. The company's actions in these proceedings will be an important part of the final decision.

II - The second area where IPC policy will affect agricultural development is in the type of new generating facilities, the timing of new facility additions, and in demand forecasts. Between 1974 and 1979 IPC was before the IPUC with demand forecasts and proposals to add new coal-fired power plants to the company system. IPC demand forecasts have consistently included at least 300,000 acres of new irrigation development including the land in the proposed action. Irrigation development has been the most important determinant in IPC forecasts of summer peak demand and the major factor in the proposed timing for new plants. IPC has participated actively in the past and can be expected to participate in the future in decisions that will determine whether electricity supply is available for new irrigation development.

IPC may, in fact, be able to exercise some discretion in whether or not to hook up new high lift irrigation loads. The IPUC staff filed a

brief in IPUC case #U-1006-09 (Amended Application) dealing with IPC's "Duty to Serve". At pages 9 and 10 the brief states:

"In the case of Idaho Power Company, one questions whether all utility customers may be required to pay higher rates in order to serve an industrial class of customer which uses large amounts of power during the utility's peak period. Thus, the duty to serve new irrigation customers may conflict with the duty to provide utility service to Idaho Power Company's other rate payers at the lowest possible rate.....Thus, it would appear that the Public Utility Commissions have the authority to determine the reasonableness of the imposition of a duty to serve upon a utility with respect to a certain class of customers."

At page 12, in the Conclusion, the brief further states:

"There are cases which uphold the right of public utility commissions to allow utilities, based upon substantial evidence, to deny service to certain classes of customers which would place unreasonable burdens upon a utility system. In a state like Idaho, which is at the crossroads of development, it would appear timely for that governmental body which is charged with regulating public utilities to determine in the light of new circumstances what duty a public utility has to serve customers in its certificated area. Only if such evaluation takes place, will utilities be able to hold down costs and the general ratepayer be prevented from having to pay unreasonably large electric bills to pay for a plant which serves temporary peak but which, due to declining farm prices, may in turn be serving to undermine the industry which is purportedly served."

III - The third area of IPC policy affecting the proposed action is the utility rate system. In accordance with the Public Utilities Regulatory Policy act, the IPUC will be holding more than two years of hearings to consider changes to the electricity rate system. The IPUC will be dealing with such issues as cost of service allocations, seasonal pricing, replacing declining block rates, and facilities changes. These issues are critical to the future irrigation rates and to the economic viability of the proposed action. IPC will participate in these hearings and potentially play an important part in influencing the IPUC's final decisions on electric utility rate systems.

(b) Comment: "We believe the approach to the power supply and economics used in the report distort the power costs. The use of 1977, a drought year, as a basis for cost distribution while using power costs in the 1980's for a new generation addition related to 1977 revenues are the most glaring examples. Power costs in the 1980's should realistically be related to expected revenues in the 1980's. The incremental addition of the total proposed new irrigation development to the 1977 load without respect to the timing or growth in other sections of the load also distorts the economics of the power supply costs."

(b) Response: This comment addresses the methodology used to assess electricity supply, cost and resulting impact to IPC ratepayers.

The method used was to estimate electricity load for the proposed action and alternative levels of development and assess the effect of this load on IPC demand patterns and generating resources. From this, four different scenarios of potential supply source and costs were developed. Impacts on IPC ratepayers were assessed by "rolling in" the supply requirement, costs and new irrigation sales to the 1977 IPC operating year, the most recent year of available data. The new power costs used were not 1980's costs as the comment states, but the 1977 dollar cost for new generation. These 1977 dollar figures for new generation were IPC figures. In a comparison of 1980's new generation costs would be much higher than the 1977 dollar figures used in the analysis.

The effects of the drought on hydroelectric generation were factored out by using median streamflow and hydrogeneration figures. Again, these were IPC figures. The other available base year, 1976, was also typical because of higher than normal streamflows.

In either method--the one used for the Environmental Statement or the proposed comparison of 1980's new generation cost and 1980's revenue, there is potential for distortion. A major difficulty with either method is the impossibility of accurately predicting the source of future electrical supply, which is why four different supply and cost scenarios were developed for the ES.

The most important potential distortion in the ES methodology is the likelihood that it underestimates the effects of energy costs on the profitability of high-lift irrigation. Electricity costs have risen and can be expected to continue rising steadily. Commodity prices, on the other hand, have fluctuated widely and in the past few years have been depressed. Existing data does not indicate a change in these tendencies. The Dames and Moore study discussed in the draft ES (pg 2-105) predicts rates nearly three times higher than the 1977 levels by 1987. Recent trends in commodity prices do not indicate such a predictable and steady rise in commodity prices.

A second potential distortion is that "rolling" new irrigation supply requirements and 1977 dollar costs into 1977 electricity sales and revenue spreads the costs over less kWh sales and less revenue than might exist in the 1980's. The tendency would be to over-estimate the effect on price per kWh. (The price per kWh is affected by the magnitude of sales and revenue; however, the total annual cost to ratepayers and per-acre costs paid by existing customers are not affected).

This problem was recognized and was the primary reason for choosing consistently conservative assumptions relating to supply requirements and cost. These would include high plant load factors, the perfect matching of new supply with new load and estimating new supply requirements based on "average case" irrigation conditions. (In years with above average irrigation demand, supply requirements and cost impacts would be greater; in years with below average irrigation demand, cost impacts would not be lower.)

The methodology suggested by this comment, that is, comparing 1980's new electricity supply costs with 1980's electricity sales and revenue, was considered for the analysis but rejected because of several important limitations. Estimations of 1980's electricity sales and revenue as a base for the analysis would be highly speculative exercise. As shown in Figure 2-17 (pg 2-102 in the ES) there is a wide range of forecast sales for the 1980's; predictions of revenue would be just as varied. Estimation of electricity costs from new generation would require forecasts of inflation in the construction and operating costs of such plants. Finally, to be useful in the economic analysis of new irrigation, 1980's electricity costs would have to be used in estimated 1980's farm budgets.

There is one further point relative to the use of 1977 rather than 1980's estimates for sales and revenue and new plant costs as a basis of assessing cost impacts. Despite the larger base of sales and revenue, the cost impacts of rolling new irrigation electricity supply at forecast 1980's prices into a 1980's operating year could be proportionally just as great or even greater than the 1977 dollar analysis used for the ES. The cost of new electricity supply has been increasing much more rapidly than electricity sales. For example, cost estimates for a proposed South Idaho power plant increased from about 25 to 38-40 mils/kWh between year 1974 and mid-1977, an increase of 56%. Electricity sales between year-end 1974 and year-end 1977 increased about 10%. A continuation of this trend to the mid-1980s would result in proportionally greater cost impacts than those estimated by the methodology used in the ES.

(c) Comment: "This distortion is demonstrated by the generation supply scenarios described in 1A and B, 2 and 3. In 1A and 1B the company would build a 250 megawatt unit to primarily serve irrigation load, which would operate at a 65 or 75 percent of the plant capacity, the balance being sold to new non-irrigation customers at the new higher average system cost or to other utilities at 10 mills a kilowatt-hour. These assumptions are not valid because no utility today builds a plant to serve one load. Generation is built on a planned basis to meet the load increase of all segments. Likewise, plants are planned to operate at much higher than a 65 percent capacity because of the high fixed costs. In addition, the going rate for power sold to other utilities is now 16 mills, and by the time the 111,000 acres are developed, obviously will be much higher."

The study has one other rather glaring omission, and that is the dynamic and changing load pattern of the company that has and is taking place. In the 1960's no one could foresee the dramatic increase in residential customers taking place today. Any new load -- residential, industrial, business or irrigation -- demands incremental generation additions. All of these new requirements should be considered in such a study. An example of the change in use patterns occurred on the 31st day of January of this year when the company experienced a new all-time high winter peak of 1,824 megawatts, only 114 megawatts below the July 28, 1978, summer peak of 1,938 megawatts. To assume that all generation would be committed for any single load such as irrigation and additional generation presents an unfair view point of the cost to serve any

individual load."

(c) Response: The primary point of these comments is the treatment of proposed action electricity load as a single load that would require incremental capacity additions without taking load increases of other classes of service into account.

The energy portions of Chapters 2A and 2B presented detailed analysis of the historical growth rates of system summer peak and average loads, the coincidence of summer peak load with seasonal low hydrogenerations and forecasts of demand in irrigation and other customer classes. Proposed action irrigation loads would add substantially to IPC peak load and reduce the hydrogeneration at the time of the year when IPC supply resources are at their lowest. No other foreseeable load in any forecasts of IPC electricity demand have the same effect on supply requirements as high lift pumping from the Snake River. This point was emphasized at another point in the IPC testimony where Mr. O'Connor stated "A double effect is created inasmuch as the electricity required to pump the water consumes new energy and the water removed from the river decreases hydrogeneration. This is a highly significant and important point to the company and its customers. The removal of water from the river will bring about the need for other generation at costs of 3 to 4 cents/kWh at the same time reducing the company's ability to generate kilowatt hours from existing hydrofacilities at 7 mils/kWh."

The implementation of the proposed action or alternatives will require a source of electricity and reduce hydroelectric generation regardless of what occurs in the load patterns of other customer classes. If new high lift pumping from the Snake River occurs on a scale anywhere approaching the magnitude of the proposed action, the resulting load would be the determining factor in the timing, size and type of IPC electricity supply additions.

Nevertheless, the cost impact analysis of case 1A did illustrate a situation where loads in other classes were assumed to increase sufficiently to use all of the non-peak generation of new capacity sized to meet the new July irrigation load.

The example of the "change in use patterns" cited in the comment does not alter the assessment of new irrigation supply requirements and cost impacts. The data does not indicate a long-term change in use patterns. The peak demand on January 31, 1979 was the result of the unusually cold winter weather, not a dramatic change in customer mix or use patterns. Adjusted for weather conditions, the summer-winter peaks of 1978 and 1979 would be typical of recent historical patterns. Another important factor relative to the comment example is the slow down of new irrigation. As a result of the water rights complaint and lawsuit discussed earlier, IPC has had a moratorium on new irrigation hookups. Cold weather and the irrigation moratorium likely account for the 1978, 1979 use pattern. The example cited does not indicate a long-term trend particularly if significant levels of high lift pumping take place.

On the supply side of the example, a one hour winter peak is not the determining factor in IPC supply requirements. On January 31, 1979, IPC was exporting some 300MW to other utilities. The constraint on the company's supply is the ability to generate sufficient baseload energy to meet summer seasonal peak demand. An additional factor is that new irrigation from the Snake River would have an impact on the company's ability to fill Brownlee Reservoir, the resource normally relied on to meet winter peak demand.

In addition to criticizing the treatment of generating plant additions to serve new irrigations loads, this comment also questions plant load factor and export price assumptions.

The comment criticizes the use of 75% and 65% plant load factors in estimating new supply costs (Scenarios 1A and 1B) as being too low. Power plants may be planned to operate at greater than 65% load factor; however, they do not operate that well in practice. Since completion in 1974, average plant load factor for IPC's portion of the Jim Bridger plant has been 54%. Annual load factors have been: 1975, 42%, 1976, 48%, 1977, 69%, 1978, 55%. The use of 50-60% load factor in the analysis would have resulted in a higher price per kWh and greater cost impacts.

The comment criticizes the assumption of 10 mils/kWh assumed for nonfirm sales of surplus power. This figure was used to represent the 1977 dollar price for surplus power to be consistent with the rest of the analysis. In the future, surplus electricity prices could well be greater. In 1977 the average price for all resale was 11.6 mils/kWh—this was mostly firm resale because of low water. The 1976 overall average resale price was 7.4 mils/kWh. For 1978 the overall average resale price was 12.0 mils/kWh. Nonfirm resale prices in 1978 ranged from 3 to 17 mils/kWh. The price for the largest block of nonfirm sales, about 1/4 of the total resale, was 10.5 mils/kWh.*

*IPC FPC Form 1, for the years 1976, 1977, 1978.

(d) Comment: "Scenario 2 supposes the company would buy precisely the amount of electricity from a neighboring utility to meet the proposed irrigation development. While it has been possible to buy power from other utilities for short times, it is becoming more unlikely, and in any event, the selling utility would require the amounts sold to be reduced as their own loads build up."

(d) Response: Scenario 2 represented the case where IPC participates in a plant sponsored by another utility. IPC participation in the Boardman plant in Northeastern Oregon, sponsored by Portland General Electric, and the Valmy plant near Winnemucca, Nevada, sponsored by Sierra Pacific Utilities are examples of this case. IPC participates in the financing of these plants and is part owner of the plants. IPC's portion of these plants is included in the IPC rate base. The arrangement is different from the situation where IPC purchases on contract from another company over a specified number of years.

With the Oregon and Nevada plants, IPC has been able to negotiate with the sponsoring utilities to take the equivalent of all of the annual power generation during the summer. For example, at the Boardman plant, IPC's share is 10% of the 500MW plant. IPC will take this share as 300MW during June, July and August and none during the rest of the year.*

Scenario 2 was designed to simulate this IPC participation in plants sponsored by other utilities. The assumption that IPC's portion of new plants could be exactly matched to incremental increases in load is a simplification which is unlikely in practice. The effect of this assumption would be to underestimate cost impacts.

*This is also an example of IPC planning in response to summer seasonal load and resource constraints, which would be compounded by the proposed action. It is not a response to "meet the load increase of all segments". (See also R.J. O'Connor-Boise Hearings #3).

(e) Comment: "Scenario 3 should not even be listed as it is too highly speculative that the company in the future could purchase B-C Hydro or BPA power at 25 mils per kilowatt-hour."

(e) Response: Scenario 3 assumptions were based on IPC purchase of electricity from B.C. Hydro in 1977. The price for this electricity was 25 mils/kWh. This figure was used as the 1977 dollar cost for the case to be consistent with all other 1977 dollar figures. As discussed on page 2-106 of the DES, the Idaho Governor's office has discussed possible future arrangements with B.C. Hydro.

As of July 1979 IPC was negotiating with B.C. Hydro for short-term purchase of electricity at a rate in the area of 30 mils/kWh.

This case was not regarded as one of the "most likely" in the ES; however, B.C. Hydro has been a supply source in the past and is being discussed as a possible source for the future. On this basis it is valid to include this case to illustrate on potential electricity option.

Commenter Number 67

(a) Comment: "I think the water consumption figures are a little too small. When we were having to replace our water system in King Hill Irrigation District, they argued very -- seven acre-feet from the river instead of two and a half listed in the environmental impact statement."

(a) Response: Two and a half acre feet of water per acre may be a conservative figure. However, this is the figure developed from studies by the Idaho Dept. of Water Resources based upon a number of on-going agricultural projects. It appears to be the only figure that can be substantiated.

(b) Comment: "I went over the farm budget plan, and it didn't

appear to be very accurate to me. I make a budget every year, and they were using 1975 costs. And I can't buy gas for what I did in 1975, my fertilizer or labor or anything. But where they have a cost or a price for potatoes, \$3.76, the best contract I know of this year is \$3.30. They list a price of \$3.56 for wheat. \$3.25 was the best in the country until last week, and it has risen some in the last week. Barley, they figure \$2.57. It's two and a quarter in our area. Alfalfa they list about \$46 a ton. It's \$35, \$40 for the very best quality. Beans, they're about right on. Sugar beets, which I'm just real familiar with, we're going to be awful lucky to get \$27 this year. And without legislation, it could fall back to \$21 on the crop we're growing now. With legislation it would be about \$28."

(b) Response: The prices you refer to are 1976 normalized prices published by the Water Resources Council. These figures are five year weighted averages and they are required in analyzing federal water related projects. Table 3-8 in the Socio Economics section of Chapter 3 shows net farm income under several different assumptions including 1976 normalized, 1977 normalized and 1977 actual prices. Your comment illustrates the difficulty of estimating crop prices because of the yearly fluctuation in the market place. The crop price spectrum depicted in the ES admittedly does not coincide with the current commodity prices paid to Idaho farmers.

Commenter Number 74

(a) Comment: "One of the things that I think is a failure on the part of the report is to evaluate the alternatives for development, which are really the most economically feasible and have the least impact on the water resource and the energy resource. And that again is the use of offstream storage for offpeak pumping purposes. With these types of developments, we will have little or no impact on the river flows at Murphy and certainly no significant impact on the peak demands on the Idaho Power Company system."

(a) Response: Please refer to the Preface of the DES. Also letter 7, Comment 4, letter 10, Comment 1, letter 37, Comments 1 and 2.

(b) Comment: "Now, one thing that I would take exception to, and that's the treatment in the report in the energy section on hydro power losses due to depletion of flows in the Lower Salmon Murphy reach. The report indicates that 617 kilowatt-hours per acre-foot of water would be lost to power production in the chain of dams down the river. The assumption made there in that every acre-foot could be used for power production in every dam at any time that the acre-foot is not there. The hydraulic capacity of the turbines in those dams now is not adequate to accept all those flows for power production, and there are no plans to install those additional units because they would not be economically feasible."

(b) Response: See letter 46, Comment 4.

Commenter Number 76

(a) Comment: "I think speaking for all entrymen concerned on this project that we can move the entrymen that's involved on the Oregon Trail to other entries that will maybe more enhance our project. So the thing that we're concerned with is the reservoir site. The reservoir plan is located in the extreme southeast end of the Oregon Trail proposed in the statement. With this reservoir in the present plan would possibly make up the most feasible project on the Bruneau Plateau. Without this reservoir site, we have nothing. We sincerely hope considerable action can be given to allow us this particular area."

Comment: Very little trace of the Oregon Trail can be identified in the area that I just mentioned. Erosion by flashflooding has destroyed the majority of the historical values. Pardon me, gentlemen. This was done before the Act was passed. A majority of the area has also been dragged of brush and seeded with grass by the BLM associated with the Grazing Cattlemen's Association. Consequently, little or no scenic value would be involved in this area. The area involved where the entrymen are located does show significant evidence of the old Oregon Trail, of which the entrymen can be changed."

(a) Response: The reservoir proposed by the Little Pilgrim DLE Group falls directly upon remnants of the Oregon Trail which have been included within the National Trails System as a Historic Trail. Not only would about 1 1/2 miles of Oregon Trail ruts be inundated by the reservoir, but the recreation use of adjacent trail remnants above and below the proposed reservoir would be degraded by the disruption of access of presently contiguous remnants and by modification of the natural landscape.

Reservoir construction would violate mitigating measures contained in Chapter 4 of this ES which stipulates that Oregon Trail remnants will be preserved during farm and farm-related development and that a corridor along either side of the trail will be maintained in its natural condition to enhance public recreational use of the National Historic Trail. Although the area in question is not high in scenic quality and has been seeded to grain, the area still resembles the scene viewed by Oregon Trail emigrants.

The trail section affected by the reservoir proposal falls within a "high priority" segment identified in the Oregon Trail Study which led to its designation as a National Historic Trail. The National Park Service, by the end of FY 81, will complete a management plan for the entire Oregon Trail. Within this plan, high priority segments will be identified as will proposed segment boundaries and management programs. The subject portion of the Oregon Trail will likely be identified as a part of a segment for public recreational use.

Commenter Number 77

(a) Comment: "You do not show any evidence (references) that you have more detailed soils information other than Map 2-1 (Geological features). It would seem logical to assume that you do have such information, but I would question this since it is undocumented. Because of the very poor soil information (or lack thereof) I will have to guess that, because of soils my DLE application is NOT a part of your proposed action. My DLE application soils are mostly Class I and II. I can show any soil man you care to send out that substantially more than half of any 40 falls into Class I or II soil, and on some of my application entire 40's are high class soil. I will concede that I have some gravel and some other minor topographic deficiencies, but according to your own rating system, I should have my entire DLE application lands added to your proposed action."

(b) Response: Detailed soil survey maps are presently on file at the BLM Boise District Office, and the Bureau of Reclamation, Boise, Idaho. Soils maps were not included in the ES, because their detail could not be depicted on the scale of maps used in the document.

About one half of the land that you have a DLA filing on was typed as Class 6 soils. The remaining land was typed as Class 3 which was not included in the proposed action level of development (only Class 1 and 2 soils). The Class 6 soils in your filing are steep lacustrine and alluvial side slopes which would not be amenable to crop production. Your bordering private farm land is much more flat and conducive to agriculture than the Class 6 soils. The Class 3 ground in your DLA filing (about 160 acres) does have development potential, especially with an existing water source on your adjacent farm.

(b) Comment: "On soil immediately adjacent to my DLE lands, and identical as far as I can ascertain by sample and experience, I have taken during the past week 2.5 - 3 tons of high quality, high protein alfalfa hay per acre for my first cutting. Last year I took 7 tons of baled hay per acre plus significant late fall grazing from the same adjacent lands without phosphate or other fertilizer. I offer the attached photographs evidence.

Small grain production from the same lands have also exceeded the upper limits of your Class 1 capabilities."

(b) Response: The apparent alfalfa and grain yields on your farm are above the normal yield for these crops in the ES study area. Good farm practices can give yields higher than those listed in Table 1-4. You may note that Table 1-4 in the FES has been revised to raise the average alfalfa production to 5.5 tons/acre which is more comparable to production on sprinkler irrigated crops in the area. In addition, refer to letter 37, Response 3.

(c) Comment: "I am particularly dismayed with your lack of analysis of water sources. Again you base your proposed action on soil

capabilities classification alone "without consideration of its elevation or distance from water. (2-5) I would have to infer that if Class I or II land were available that you would allow lands on top of Bennett Mountain!! Facetious, yes, but again I want to gain your attention."

(c) Response: As stated in Chapter 1, there are about 530 Desert Land Act and 16 Carey Act applications on file within the ES study - many of which are filed on the same land. It is impossible to analyze the feasibility of each one in the ES. The water source and delivery systems are important considerations in the feasibility of a particular farm proposal. The proposed action and alternatives 1 and 2 were based on soil locations, however, because this was considered the best basis to judge where likely locations for potential development would be. The different levels and locations of development depicted in this ES are likely but theoretical place of potential farm expansion, which would be subject to refinement and adjustment based on project site specific considerations.

The soil survey was based strictly on soil and landscape parameters without any outside bias from the elevation or distance from water. Keeping these parameters pure, it will then be possible to overlay other data containing factors such as elevation and distance from water, to help derive the economic feasibility of any particular farm unit which was done.

(d) Comment: My DLE application proposes to use free water, free flow, free cost, (except to pressurize). In your brief and undocumented references and narrative to ground water, you do not mention or analyze free flow water. By chemical analysis, my source water is almost pure with no detrimental elements. It also has thermal qualities which enhance early and late crop production. I now have available a water supply (including storage, cooling, etc.) far in excess of all requirements to handle my private lands and all application lands.

What this boils down to is economics; by comparative costs analysis I could irrigate my DLE application lands for 20-30% of the cost of high lift Snake River water. You state you plan to go ahead with your proposal based on soil classification alone. Is this possible? .

You expend great verbage to analyze deep well and high lift water sources with associated costs and economics. Question: Where is a similar analysis of free flow water?

Your statement is geared to new farm development. It does not reference or analyze my situation wherein I have an established base adjoining my DLE application lands. House, water, machinery and other facilities are all in and paid for. Past BLM policy has given special consideration and preference to Ag. lands applied for which adjoin private lands being farmed."

(d) Response: You have a unique situation with an adjoining farm to your DLA application already in operation. The water source sounds to be of adequate supply without the need for high lift pumping and extensive irrigation transportation facilities. The expansion of your

present farm operation onto adjoining public land sounds to be a viable proposal.

You may be one of only a few individuals that have such circumstances. This ES has focused on larger project oriented developments since this comprises a great majority of DLA and CA applications. Your application will be processed even though it does not fit the "mold" of most filings, once the ES is completed and BLM decisions are formulated on allowing further agriculture expansion on public land.

(e) Comment: In reference to elevation, my ranch experiences 120+ frost free days, whereas, your Class II soil rating only requires 80 FFD's. Again you would allow such a theoretical example with 80 FFD's based on soils alone.

(e) Response: Frost free days do make a difference in production. The standards for FFD's were established prior to the initiation of the survey and were set up to serve as a guideline for the limitations of each class. FFD's were not a factor in classifying lands in the ES area, because existing data indicates that most of it is above the 110 days limitation for Class I lands.

Commenter Number 78

(a) Comment: "What I'd like to show here, I have this 80 acres here, which I have the legal description written and you can take that later, and then another 80 acres here, and the only part of the land that has been released under the minimum dispersal is the lower 40-acre piece here. And 40 acres, I don't believe anyone can show a feasibility on farming 40 acres. But I do believe I can show a feasibility on the entire 160-acre piece, especially when my intention is to purchase and farm the 40 acres that ties these two together.

So I would just request that I would be given—that instead of this arbitrary minimum dispersal that came out in the report, that you'd give special consideration to show each entry that is proposed under Carey Act, that it would be shown that it be considered as a unit rather than just to take little block 40's out and give them special preference and eliminate other 40's."

(a) Response: The BLM will study each DLA and CA proposal and judge it on its merit in more detail after a final decision is made on allowing further agriculture expansion on public land. Under the ES proposed action and minimum development alternative framework Lot 2 of Section 31 is the only parcel that has a majority of Class 1 and 2 soils. Lot 1, Section 31, is included in the maximum development alternative because it has mostly Class 3 soils.

Commenter Number 80

(a) Comment: "It is declared to be the policy of the Congress expressed by this Act to preserve the said preferential status of the public bodies and cooperatives and to give to the people of the states within economic transmission distance of the Bonneville Project reasonable opportunity and time to hold any election or elections or to take any action necessary to create such public bodies and cooperatives as the laws of such states authorize and permit and to afford such public bodies or cooperatives reasonable time and opportunity to take any action necessary to authorize the issuance of bonds or to arrange other financing necessary to construct or acquire necessary and desirable electric distribution facilities, and in all other respects legally to become qualified purchasers and distributors of electrical energy available under this Act.

It is not necessary and is totally unfair to consider Idaho Power as an energy supplier for these irrigation projects. River Rural Electric Cooperative is a nonprofit organization and stands readily available to incorporate the future energy and irrigation needs of any within these areas as no other cost to any public utility consumer in the Idaho Power District.

Energy allocation planning is currently in process, and the Bureau of Land Management has a responsibility to assist future entrymen in obtaining the lowest possible cost energy available."

(a) Response: According to discussions with the Bonneville Power Administration's regional office in Idaho Falls, River Rural Electric Cooperative is incorporated and qualifies as a preference customer of BPA. The co-op requested electricity supply from BPA in 1976. The response of Bonneville Power Administration was that they did not have power to supply River Rural Electric Cooperative.

Under present BPA regulations, River Rural Electric Cooperative, as a preference customer of BPA, would potentially be able to obtain electricity supplies now going to BPA direct service industrial customers (mostly aluminum plants). The contracts for these industrial customers begin to expire in the early 1980s. However, the future allocation and availability of BPA electricity to new public utilities is uncertain. BPA's allocation planning and legislation now before Congress could change the availability of BPA power to new public utilities such as River Rural Electric Cooperative.

(b) Comment: "It is selfish and very unwise to limit Idaho growth because of present produce conditions. If these new projects could lower the national potato price 34 percent, just think what they could do for the national energy supply by converting crops to alcohol-producing products and cattle feed with the residue of the alcohol process. If only 20 percent of the Idaho produce was converted to alcohol, energy no longer would be such a devastating problem.

The fuel conservation factor alone should motivate rapid development of many areas. Some types of potato crops are reportedly producing 7 gallons of alcohol per hundredweight."

(b) Response: This comment discusses the possibility of alcohol production for fuel using crops grown on the proposed action. One important consideration relative to fuel production from proposed action crops is the relatively large amounts of energy required to raise these crops. In Chapter 3 of the DES, pages 3-84 to 3-87, total electrical and chemical energy impacts for various proposed action crops were estimated. For potatoes, the estimated energy input is 3 to 6 times the estimated energy content of the alcohol that could be produced. For sugar beets, energy input is 2.5 to 5 times the energy yield of alcohol produced; and for wheat, input is 4 to 7 times energy output. The proposed action would use at least 2.5 BTU in raising crops for every BTU of alcohol produced. Most of the energy input is electricity for irrigation pumping at the average pump lift and distance for the proposed action.

The output figures vary because of different assumptions that can be made about the process energy required to convert the crops to alcohol (breakdown of starch to simple sugars, fermentation, distillation and handling of waste products) and alcohol yield. These figures are only an indication of energy input/output for alcohol production. More precise figures would require a much more detailed analysis than is possible here.

Commenter Number 83

(a) Comment: "Another impact which cannot be ignored is the conversion of grazing land to irrigated croplands. Obviously, if irrigation development is to occur, steps must be taken to reduce this impact to a minimum.

The report analyzes these impacts without considering mitigating efforts and, in fact, ignores the trend elsewhere in Idaho where BLM has been suggesting significant reduction in AUM's on federal lands in absence of other activity.

Perhaps the more correct impacts is the difference between that reduced level which might otherwise eventually result for the grazing resources of the Bruneau Plateau and that level that could be maintained under enhanced conditions on remaining national resource lands under project funding conditions for the alternatives identified.

As you are aware, the Carey Act statutes of the state recognize this as a responsibility of the new family farmers who would benefit from the irrigation development."

(a) Response: See Letter 56, Response 28.

(b) Comment: "Table 8.33 is designed to summarize the aspects of

the analyzed alternatives and methods of land disposal.

Yet, the only impacts which are identified in the table, according to the title, are the adverse impacts. A reviewer of the report is required to obtain the beneficial impacts from the text."

(b) Response: The table has been revised to also address those beneficial impacts that can be identified.

(c) Comment: "In the economic area, an area where we provided much of the analysis, I believe a cleaner and clearer presentation needs to be made. The farm budgets, for the sake of simplicity, use a custom rate approach in determining costs. This is a standard method used by most economists and is valid.

However, if one is looking at the income to the farm family, a portion of the labor component in the custom rate analysis can be considered a farm family income. On a typical farm, this could represent a substantial farm income.

(c) Response: See Letter 42, Response 1.

(d) Comment: "Another item is other research, including our own, indicates that the effect of farm production on farm prices as described in the report is unrealistic. That change significantly affects the impacts described."

(d) Response: See Letter 25, Response 1.

Commenter Number 84

(a) Comment: "Again, I believe -- and you can correct me if I'm wrong -- all of the filings or nearly all of the filings in the subject area -- both Carey Act and BLM -- preceded the effective date of October 1976 of the FLPMA.

If that is correct, I do not believe that you can legally vest your authority to manage these withdrawals or these requests for withdrawals under that federal legislation. Under the Grandfather clause of all existing filings, those would have to be preceded under your old law and that the Carey Act would be the primary law and question for the Carey Act filings.

In summary, gentlemen, the existing law, unless you gentlemen since you have been denied rehearing by the Circuit, unless you can by some miracle grant some, get some discretionary authority from Supreme Court, you are dead in the water on the legal issue as to the Carey Act.

And that means that once the request for withdrawal has been made by the state for the Carey Act files, then it is your responsibility to make your request as to the land whether or not it's a desert, nonmineral -- which I presume most of you gentlemen could do fairly easily -- and at that point in time transfer the land to set it on

temporary withdrawal to the state for purposes of their conducting the engineering studies to determine and reaffirm that that is, in fact, the case.

When that is done, I believe you have no discretionary authority to determine what should be done about the land, how much should be set aside for the birds and the bees and the fish. And all you have the authority to do is give it to the state, up to that 2.4 million we have left in our authorization.

So as a practical matter, as a legal basis, the impact statement has no validity at all for any of the Carey Acts. As to the post-1976 or October 1976 DLE filings, it would have validity and would be covering and affect and control on those filings."

(a) Response: See Letter 7, Response 5.

Commenter Number 85

(a) Comment: "Little trace of the Oregon Trail can be identified in the area I am talking about for the reservoir. There has been considerable erosion by the flash flooding throughout the Cassia Gulch area where this trail was in the beginning, and it has destroyed historical relics. The majority of the area also has been robbed of brush and seeded to grass by the BLM associated with the Cattle Grazing Association. Consequently, little or no scenic value would be involved in this area, whereas the area involved where the entrymen are located does show significant evidence of the Oregon Trail."

(a) Response: The proposed reservoir would inundate a little more than two miles of the route of the Oregon Trail. Of this, about 1 1/2 miles of ruts are still visible. Although the area is not high in scenic quality and has been seeded to grass, it is free of man-made features and still resembles the scene as viewed by Oregon Trail emigrants.

(b) Comment: "I don't agree with the projected figures of the increased economy and employment involved in the statement. For example, 16,000-acre project is usually -- has been handled out of virgin land and would probably produce at least 50 percent potatoes, of which they would run something in the neighborhood of 3-million bags at 375 bags to the acre, of which is kind of on the light side into some of the yields that they raise in better ground."

(b) Response: The crop distribution shown in Table 1-4, illustrates a composition used on a sustained rotation basis in about ten years. The distribution was derived from a number of high-lift pumping projects in or near the ES area. Commonly, in the first few years, potatoes are grown on 50-100% of the farm acreage. But, this cannot continue because of reduced yields and disease problems.

The yields (in Table 1-4) are from Statistical Crop Reporting Service information. See Letter 37, Response 3.

Commenter Number 86

(a) Comment: "And one of the subjects I would like to kind of cover is on -- oh, I was running through the draft statement, and one I kind of picked out to kind of cry a little about would be budget costs for operating 310 acres or 320 acres.

I noticed it was all based on custom work. I would like to see a farmer have custom work done and make a living at it on the farm, which I think that's a little bit misleading in that area."

(a) Response: It is unknown at this time whether potential entrymen will farm each unit independently or whether they will form cooperatives to purchase equipment. There is also a great variability between farm operations regarding depreciation and interest expenses. Because of the uncertainty and variability, the custom harvesting approach was used. This method approaches the true cost of farming and the custom rates include charges for labor, depreciation, and interest. The production costs used in the budget were derived from actual budgets in Owyhee County.

(b) Comment: "And the prices, the current prices and current yields that I notice happening in that area down there -- and it's a little bit better than what you have shown there. I realize that you have to have a kind of an average thing of the whole setup rather than to pick out all of the goodies. I understand that."

(b) Response: Concerning yields refer to Letter 37, Response 3. Three sets of crop prices were used: 1977 actual prices, 1977 normalized and 1976 normalized. These prices were derived from the Water Resources Council and the Idaho Statistical Crop Reporting Service and are further explained in Appendix 3-2. Because these figures are averages, they will differ from specific farm operations.

Commenter Number 87

(a) Comment: "One impact that struck me as being very misleading, unless you calculated it out, was wind erosion losses which indicate from zero to seventy-five tons of soil lost per acre per year. Seventy-five tons of soil is a lot of soil.

However, if you calculate that out, it amounts to less than half an inch of topsoil per acre. And that's the maximum. And it does indicate that that is from zero to seventy-five.

I have seen the winds move that much soil on given years. However, it's rare. And I think that we need to be aware that the 75 tons based over an acre is more minimal than 75 tons indicates."

(a) Response: Text changes in the FES have been made regarding wind erosion rates. See Chapter 3, 5 and 8 under Soils.

(a) Comment: "The maximum acreage development which was evaluated, the 28,000-acre development is really no alternative when you consider that without small acreage, a fragmentation is such that you could never have an economical project."

(a) Response: Under the alternative there were many scattered small tracts of land that probably could not be economically developed. The 28,000 acre level would allow development on Class 1 and 2 soils under 500 foot pumping lift. This alternative was established to compare electric power utilization with that of the proposed action and maximum development alternative. If the BLM would for instance, decide to allow farm expansion at the minimum development level discussed in the ES, it would work with the specific DIA and CA project proposals within that area to try and "blend" farm layout with the soil conditions. The 28,000 acres farm configuration in the ES is considered somewhat theoretical, and in reality, farms would probably be located differently than depicted in the ES.

(b) Comment: "The failure to evaluate it and consider what are obviously more energy and water efficient projects such as offstream storage and pumping during nonpeak seasons and the time problem which evaluating the Bruneau Canal Project really make a lot of the work that went into the effort somewhat futile and meaningless."

(b) Response: The BLM had a responsibility to evaluate the existing type of DIA and CA proposals on file. The great majority of these involve high-lift pumping from the Snake River. Decisions could not be made on these applications until an ES was done. The Bruneau Plateau Water Development Project will be studied by the Idaho Department of Water Resources over the next two years. There were a number of comments on the DES concerning irrigation development by off-stream storage. This concept is described in general terms in Chapter 8 of the FES. It is too early to do a comprehensive analysis of any off-stream storage projects because they are still in the planning and feasibility stages.

(c) Comment: "Some of the assumptions that were made, though, perhaps because of the time frame or something else, are really not correct. The report says that the assumption would be made that 2.58 acre-feet per acre of water would be pumped from the Snake River with 15 percent of that as return flow. Recent studies by the University of Idaho indicate that the return flow would be more like eight-tenths of an acre-foot per acre that was assumed in that return flow study. That assumption in itself decreases the impact on the flows at Murphy and downstream due to the pumping in the reach of the river in question."

The environmental statement indicates that the 2.58 acre-feet per acre year, be the pump diversion in a normal year and that in the worst case, year, 3.51 acre-feet per acre would be diverted.

The fact is that during 1977 Bell Rapids Project diverted 2.62 acre-feet per acre as opposed to the assumed 3.51 acre-feet per acre in a worst year case. That in itself would result in a 25 percent decrease

in the impact at the Murphy gauge in the normal year or in the worst year."

(c) Response: "Actual diversions and return flows will vary with different years and localities. Because of this, "average" figures were needed to address the water required to service the proposed action. The Idaho Department of Water Resources studied diversions for existing projects in the study area and concluded that a diversion figure of 2.58 ac.ft./acre and a return flow of 15% were reasonable. One of the projects studied was Bell Rapids, along with several others. One cannot use one situation such as Bell Rapids and apply it to all proposed development, when there is better information available. The same applies to the University of Idaho study concerning return flows. This is one piece of information, but not indicative of the whole picture. See Letter 46, Responses 2 and 3.

(d) Comment: "These kinds of assumptions negate, really, the power determinations and many other things which predicate and will influence greatly the decisions on the statement. The assumption that 617 kilowatt-hours per acre would be given up or would be lost hydro power production due to the pumping of an acre-foot of water for those lands is pretty close, if you consider or if you assume that every reservoir will be full to the top and that every acre-foot can be utilized during the time when that acre-foot is not pumped or is pumped."

And this is not necessarily the case, especially in April and May periods in a normal year and certainly in a wet year. The downstream dams are spilling and that water isn't used at all for power production. So charging the development with those foregone costs is not reasonable. In fact, the April-May Idaho Power Company capacity exceeds the loads for those periods, and yet it appears that these hydro power losses are charged to the development at the rate of 35 mills per kilowatt-hour, which is the equivalent of replacing that hydro power loss with coal-fired power, which in fact it's surplus power which could come on at a price considerably less than that.

(d) Response: See Letter 46, Response 4.

(e) Comment: "In evaluating the farm budget and looking at the economics of a 320-acre farm development in those lands, the report indicates that the crop value should be \$511 per acre per year, the gross crop value. A recent study by the University of Idaho says that with the existing crop distribution and '77' prices on the Bell Rapid system that the gross crop value is really \$590 per acre."

(e) Response: See Letter 46, Response 5.

(f) Comment: "Another item in the farm budget analyses was power cost. The BLM says that the power costs for land in the impact area or in the study area would be \$70.63 per acre per year. The fact is that Bell Rapids, which is in the middle of the project, experienced in 1977 a pumping cost of \$49.22 per acre."

That's a difference of almost \$21 an acre, and it shows the sensitivity of the economic analysis to the final outcome.

(f) Response: The electricity cost for irrigating land in the study area of \$71 per acre was based on scenario 1B, one of the two "most likely" cases, namely, that Idaho Power Company would construct new coal-fired generating capacity to meet the demand of the proposed action. In this case, as a result of the increased cost to the IPC system of the new generation, electricity cost to irrigators would rise from the 1977 level of 16 mills/KWH to 21.2 mills/KWH. (Table 3-20).

According to a recent report by the Idaho Water Resources Research Institute, Bell Rapids used an average of 3146 KWH/acre in 1977. At the 1977 average price to irrigators of 16 mills/KWH, this would amount to a pumping cost of approximately \$50/acre. At the new rate projected under case 1B, Bell Rapids cost would be about \$67/acre.

Looking at the proposed action as a whole, however, lift heights and horizontal distances from the river are on the average slightly greater than for the Bell Rapids Project. (Proposed action median lift height and distance are 600-700 feet and 4-6 miles). Therefore, on the average, the proposed action would consume more energy per acre than Bell Rapids. Taking the total proposed action direct consumption of 374 million KWH/year times the new average price to irrigators of 21.2 mills/KWH and dividing by the total proposed action acreage, the average electricity cost of \$71/acre is arrived at.

(g) Comment: "Another item is the determination or the calculation of downstream hydro losses in Idaho Power losses in the Idaho Power Company system. The report indicates that power losses of Lower Salmon were underestimated. Why were they? Was there not time to make them right? Why not crank those in and make the numbers come out right?"

It indicates that the 48-year power generation computation that used actual corrected historical flows for determination of generation was not right because it did not use average monthly stream flows. Actually, the method used was superior to using average monthly streamflows.

The report indicates that Idaho Department of Water Resources, in the process of correcting the water distribution and a number of other errors in the computer. I would like the BLM to define what the other errors are and if they are significant, maybe their whole analysis is not valid. What are the other errors? They should be itemized."

(g) Response: Hydroelectric losses have been re-estimated for IPC dams in the Final ES. The explanation of the methodology for these hydroelectricity estimations is contained in Appendix 3-5.

All IPC dams affected by irrigation diversions in the study area, including Lower Salmon Dam, are included in the estimates. The procedure used to estimate hydroelectric generation losses used the average monthly flows from 48 years of records to estimate monthly generation with and without the proposed action diversions. This procedure was used in order to make hydroelectric generation comparisons consistent with the methodology used by IPC. However, IPC uses median

rather than average monthly flows.

A major problem in the estimations of hydroelectric losses in the draft was a different monthly distribution of water diversion for direct demand and hydroelectric loss estimations. This has been corrected in the final ES.

Commenter Number 89

(a) Comment: "The map labeled 1-3, Agricultural Development Status as of January 1, 1979, lists land as being up for private exchange applications. This land is in a withheld status or withdrawn, and in our opinion it cannot have any private exchange applications considered.

The land in question has had an active Carey Act application since 1974 with corresponding water filings dated 1974. The land was petitioned for restoration to Carey Act in 1976."

(a) Response: See Commenter 65, Response 1.

(b) Comment: "Our lands currently listed in the minimum release area because of their 500-foot lift will be watered more economically from this canal using gravity pressured water. Using figures on Table C, Page A-64, we could irrigate 7,000 acres of land with a lift over 600 feet with the same amount of power it would take to irrigate just 6,000 acres located six miles from the river but with a lift of only 550 feet."

(b) Response: See Commenter 65, Response 2.

(c) Comment: "Dove Springs is located south of the Grindstone project. These lands have been placed in your proposed release area. I have included a legal description of the outside boundaries of this project for your use. Your studies show that all of these projects located back from the river will all use summer flow pressurized water.

We submit that this thinking vastly overestimates the power loss from summer pumping as most of these projects must plan for off season storage to be economically feasible. Should off season pumping in a reservoir be impossible, then projects located back from the river could not in most cases be economically feasible in the four year release program you have planned."

(c) Response: Off season storage filled from the Snake River will not necessarily eliminate impacts on downstream hydroelectric generation. In low flow years the effect of offstream storage or the ability to fill Brownlee Reservoir would be an important consideration.

Based on the farm budget analysis in the ES, projects with high lifts located back from the river are probably not economical. The economics of such projects with offstream storage would depend on how much of the cost of canals, pump stations and dams associated with offstream storage projects are paid for directly by the projects.

Commenter Number 90

(a) Comment: "I'm also a general counsel of the Potato Growers of Idaho and have sat on the negotiating team with the Idaho Frozen Foods for a number of years. And you relate on page 3-68 crop prices.

This has absolutely no relationship to reality. None whatsoever. Over the first five years of the proposed action, nationwide prices — nationwide — prices paid the farmers, for potatoes could drop as far as 34 percent if all other factors remain equal.

Well, all other demands is never going to remain equal. Consumer demands, production costs, no other new land being developed, etcetera. It goes on then on your Table 3-16 and sets out that this area, the total area which, as I say, is not likely to come into production for 15 years, at least, 20 at the most, will produce 7-million hundredweight of potatoes. It won't.

That presumes an average acreage production of 300 sacks. Last year, the best year in the production in the history of the State of Idaho, our average was 252 sacks an acre.

Now, you know how many potatoes are raised in the United States? There would be about 310-million hundredweight this coming year. There is about 300,000 acres already in production in Idaho. We'll raise around 95-million hundredweight in Idaho this year.

Now, this fellow, for some reason, says that the application of about 25,000 acres of spuds over a period of years will reduce the nationwide price by 34 percent. And he has the audacity to bring it down to a dollar seventy-four a hundredweight."

(a) Response: The analysis on potato prices was the best study that could be located when the DES was put together. Since the draft was finished, the BLM has contracted for a potato price assessment from an agriculture economist from Washington State University. The results are included in Chapters 3 and 8 of the FES, which better reflect the reality of further farm development on potato prices paid to farmers.

The statewide average last year was 275 hundredweight per acre (according to ESCS Crop Reporting Service) and 325 hundredweight in the counties of Southwestern Idaho (ES area location). The ES assumes an average potato production of 315 hundredweight per acre (see Table 1-4).

(b) Comment: "Now, adjacent to our farm alone I would bet you there is 300 Hungarian partridge that live there year-round. There are alot of chukars. We have two rooster pheasants and eight hens nesting there this year. And yet the impact report insists and suggests that there is an adverse impact on wildlife and game.

Such is just not the case. It has increased tremendously and it has increased in that type of game bird that is most desirable to hunters and to the general use of the public."

(b) Response: As stated in the wildlife impacts section much of the wildlife occurring in the proposed agricultural development area would be adversely impacted by this use. There would be major impacts to mule deer, sage grouse, birds of prey and many of the animals which comprise their food source, reptiles, and many of the sensitive species which occur in the area.

There would also be beneficial impacts for some wildlife. As pointed out in the impact sections (Chapter 3) dealing with California quail, Hungarian partridge, mourning dove, pheasant, and in some instances waterfowl, significant beneficial impacts would act upon these birds thereby leading to increased populations due to new agricultural development as set forth in the proposed action. A preface to each of the stated beneficial impacts in these sections is that the proposed agricultural development be intermingled with tracts of native vegetation (as stated in the proposed action) which would provide important wildlife cover at certain times throughout the year.

APPENDICES

APPENDIX 1-1

WILDLIFE LEAVE SELECTION CRITERIA

Wildlife areas will be selected according to the following criteria:

1. Tracts will be distributed throughout any developed area and will comprise at least 15 percent of total developed area.
2. Minimum tract size will be 80 acres. Width must be at least $\frac{1}{4}$ mile.
3. Tracts will be within 1-1 $\frac{1}{2}$ miles of each other.
4. Tracts will be located on or adjacent to any important wildlife habitat (existing or future).
5. Tracts will have public access.
6. Tracts will have highest percent canopy coverage available.
7. Tracts will have highest percent perennial vegetation available.
8. Tracts will be adjacent to existing or future ponds.
9. Tracts will be adjacent to existing or future mainlines.
10. Tracts will have best soils available.

It is estimated that only one-half of the 37,000 acres will actually become interior isolated tracts. The balance of the 37,000 acres of Class I and II soils not put into isolated tracts will provide mitigation opportunities for wildlife and are discussed in Chapter 4.

The isolated tracts will be managed for their wildlife habitat values. Each tract will be fenced for identification and protection. Water catchments will be developed at strategic locations for wildlife, and where the existing vegetation is not optimum, dryland shrubs, forbs, and grasses will be established.

An application for water-right will be made on all wildlife isolated tracts. This water-right is needed so BLM can take advantage of any opportunities to obtain water from adjacent farm operations. This water will be used to irrigate shelterbelts, nesting habitat, and cooperative farm areas. The actual development of irrigated areas on the isolated tracts will be dependent upon negotiation with adjacent landowners, since their water delivery system would be utilized to get the water to the isolated tract boundary.

It is estimated that not more than 30 percent (about 5,400 acres) of the isolated tracts (about 18,000 acres) would actually be irrigated under this cooperative program. This would require a water-right for approximately 14,000 ac/ft annually.

APPENDIX 1-2

INDIAN HILLS IRRIGATION PROJECT SUMMARY

The Indian Hills Project is located in Owyhee County approximately 18 miles southeast of Mountain Home, Idaho. A portion of the project lands were developed in 1964. Part of this early project was abandoned because of the lack of reliable pumping equipment. The Idaho Water Resource Board is proposing to redevelop this project using the Carey Act. The principal features of the project are:

1. A river pumping plant to have a maximum capacity of approximately 86 cfs for a total pumping head of 435 feet to be equipped with five 1,000 hp. and one 600 hp. vertical shaft turbine pump.
2. A 48 inch diameter steel penstock, 1,262 ft. in length, with wall thickness varying from 1/4 to 3/8 inch.
3. A regulating reservoir with a surface area of 6 acres and a capacity of 30 acre-ft., asphalt membrane lined.
4. A buried pipe distribution system consisting of approximately 1 mile of low-head, 48 inch diameter concrete pipe and 10.9 miles of buried pressure distribution system. Twenty-seven pressure farm turnouts will be provided.
5. Seven booster pumping plants will provide sprinkler pressures that range in size from 700 hp. to 60 hp., with a total of 2,040 hp. installed.
6. Construction of about 11 miles of access roads for maintenance, and facilities to control surface drainage.
7. Construction of a domestic water system to serve the project consisting of a well, storage tank and distribution pipe lines to furnish residential water.

The total project area comprises 6,980 acres. Of this total 4,554 acres will be developed as agricultural farmland and 2,426 acres will be retained in federal ownership to be managed for wildlife purposes.

The development of the proposed project will have both beneficial and adverse impacts on the natural and human environment. The project development will have a significant impact on raptors nesting in the Silver Creek Drainage. This impact will be from loss of hunting habitat and increased disturbance from man's activities. The project will also result in a small reduction of power production in the Snake River and consumption of energy.

Beneficial aspects of the project include increases in the property tax base and employment. Enhancement of wildlife lands will be accomplished by the establishment of windrows and by intermittent irrigation in selected locations. Return flow of waste irrigation water to the Snake River will be essentially eliminated.

Proposed Plan

The physical location of proposed facilities are shown on the Project Map (located at the end of this appendix section). These facilities include a river pumping plant, steel pipe penstock from the river to a regulating reservoir, an asphalt line regulated reservoir with six acres of surface area, a low-head 48" concrete pipe, booster pumping stations discharging into a buried pipe distribution system, and pressurized farm turnouts for each 160 acre tract. A spillway is provided at the regulating reservoir. Maintenance roads are provided for access to farm turnouts and other project facilities. A new access road and farm roads, where required, will be provided in conjunction with Owyhee County. Windbreaks will be planted within the road right-of-ways at selected locations to control wind erosion. Obtaining domestic water supplies with acceptable quality at reasonable costs on an individual farm basis appears unlikely. Accordingly, a domestic water system is planned for residential needs and for stock watering. Operating and maintenance facilities will include a residence for the project manager and conversion of an existing structure to a combination shop and office building. The required initial operation and maintenance equipment and spare parts will also be provided. Surface runoff and drainage due to over irrigation will be controlled by a series of small impoundments generally situated in the wildlife lands. Small terminal ponds will also be provided for draining lateral lines and flushing main lines. These facilities are designed to prevent irrigation return flows from reaching the Snake River.

Construction of facilities solely for wildlife enhancement is not contemplated, however, wildlife lands are provided in the project. Where practicable, designs have been "slanted" to provide wildlife benefits without increasing costs. The drainage control facilities and windbreaks particularly will provide enhancement to wildlife in the project area.

Project Design

The river pumping plant base will be constructed of reinforced concrete and will provide for installation of six vertical-shaft turbine pumps. The general arrangement is typical of a number of successful pumping plants in this reach of the Snake River. The pumps are mounted on an open concrete deck over a sump structure which is connected to the Snake River through a screened intake. Five of the pumps will be driven by 1,000 hp. vertical, hollow-shaft, six pole, 2,300 volt motors operating at 1,180 rpm. One of the pumps will be a 600 hp., 2,300 volt electric motor for operation at 1,180 rpm. The 1,000 hp. pumps have a rated capacity of 7,100 gallons per minute at a total operating head of 435 feet. The 600 hp. installation has a capacity of approximately 4,200 gpm at 435 feet TDH. The combined capacity of the pumping units is 39,700 gpm or about 88.5 cfs. An allowance for wear of 3 percent was made, which gives a net capacity of approximately 86 cfs. which is equal to the maximum probable demand for irrigation water. The reliability criteria used is that the river pumping station should be capable of

furnishing 90 percent of the "50 percent probability" demand for irrigation water with one unit out of service. The overall efficiency of the pumping units is estimated at 81 percent for computation of power costs.

Each of the individual pumps at the river pumping plant will be manifolded to a steel penstock. Pump control valves, check valves and other fittings will be provided. A pilot operated surge relief valve will be installed to relieve water hammer surge from power outages.

Electrical controls for the pumping station will be installed in a control room at the rear of the pumping station. The power company's substation transformers will be located adjacent to the control room. The pumping plant will have a metal roof with removable access panels for pump and motor repairs. The inlet sump to the pumping plant is proportioned for inlet velocities less than 1 fps. at minimum expected water elevations. Remote monitoring equipment will be provided at the project headquarters. Based upon information presently available, the deck of the structure will be approximately 2 feet above water level at 50,000 cfs. Electrical controls and motors are located at such elevation that approximately 3 feet of water over the deck will be required before the pumping station is rendered inoperable.

The Snake River is wide and braided at the pumping plant site. Some additional excavation in the river bottom is required to provide the required submersion at minimum flows of the river. However, some problems with sedimentation may be encountered unless minor channel alterations are provided.

A 48" diameter steel penstock will convey water from the main pumping plant site to a regulating reservoir at the top of the Snake River Canyon rim. Preliminary designs call for this pipeline to be buried with minimum coverage of about 3 feet. About 400 feet of excavation through rock is expected between stations 6+00 and 10+00 of the pipeline. Wall thickness of the penstock will vary from a maximum of a 3/8 inch to 1/4 inch diameter depending upon the total operating pressures. Velocity in the penstock at maximum flow rate is approximately seven feet per second. The penstock discharges into the reservoir through a reinforced concrete structure to provide for energy dissipation. Thrust blocks will be provided.

The existing reservoir will be raised about 2 feet and lined with a buried asphalt membrane to control seepage. The regulating reservoir will minimize frequent starting of pumps. Devices will be provided to sense water levels in the reservoir which will control operation of the river pumping plant. A second control is provided which will override the primary control system and stop all river pumps, sequentially, in case water level in the reservoir exceeds safe operating maximums. This condition could result from a power outage or other emergency shut-down of the booster pumping stations which did not affect the river stations. Additionally, an alarm will be provided to indicate an incipient spill from the regulating reservoir. A spillway structure is provided in the form of a rectangular launder. This structure also serves to drain the reservoir. Spills are expected to be very infrequent because of the

control safeguards noted. In case of a spill, however, water would be conveyed by means of a 33 inch pipeline to an outlet structure located near the canyon rim. A rock-lined channel would be constructed to convey water down the canyon rim.

Two outlet structures are provided from the reservoir to convey water to the booster pumping plants. A 48" pipeline for regulating purposes. A 28" diameter steel pipeline conveys water southerly from the reservoir approximately 450 feet to booster pumping station B.

Preliminary designs were developed for a canal to convey water westerly from the reservoir in lieu of the 48" pipeline. The 48" pipeline was selected based on anticipated savings on O&M costs and difficulties associated with spills at the westerly end of the canal. Therefore, the entire distribution system will consist of buried pipelines. Pipeline location and sizes are shown on the Project Map.

A number of booster pumping stations are provided as shown in the facilities map. These will furnish the required pressure for operation of sprinkler systems. The larger stations are equipped with multiple pumps in order to more efficiently meet the varying demands. In general, these pump stations are planned as out-door type with open sides and roof structure to protect against direct sunlight. Pump control valves will be provided to regulate water hammer surges from power outages and pump starting and stopping. The two largest stations use centrifugal pumps because of desirable operating characteristics. Stations "A" and "G" are vertical shaft turbine pumps with a can or pot type housing. Control systems will be provided to shut down in case of low suction pressure to provide a time delay between pump starting and stopping and to maintain desired operating pressures. Table 1-A gives a summary of the booster pumping station size and capacities.

TABLE 1-A
BOOSTER PUMPING STATION SUMMARY

Station	Q cfs	H-ft.	No. Pumps	H.P.
A.	17.1	176	4	400
B.	25.6	192	3	700
C.	2.85	125	1	60
D.	29.6	138	4	700
E.	8.5	35	2	60
F.	2.85	125	1	60
G.	2.85	152	1	60
TOTAL	89.35			2,040

Pressurized farm turnouts will be provided at each 160 acre farm unit. A shut-off valve and in-line totalizing flow meter will be provided. One of the farm turnouts requires a pressure reducing valve.

A mainline pressure regulating station is required on pipeline D at about station 131+20. In order to minimize operating problems with

restarting after a power outage, the pressure reducing valve station on pipeline D will be equipped with a pressure sustaining feature.

Maintenance roads will be provided for ready access to the project facilities. These are generally 14 feet in width with a gravel base and surface course.

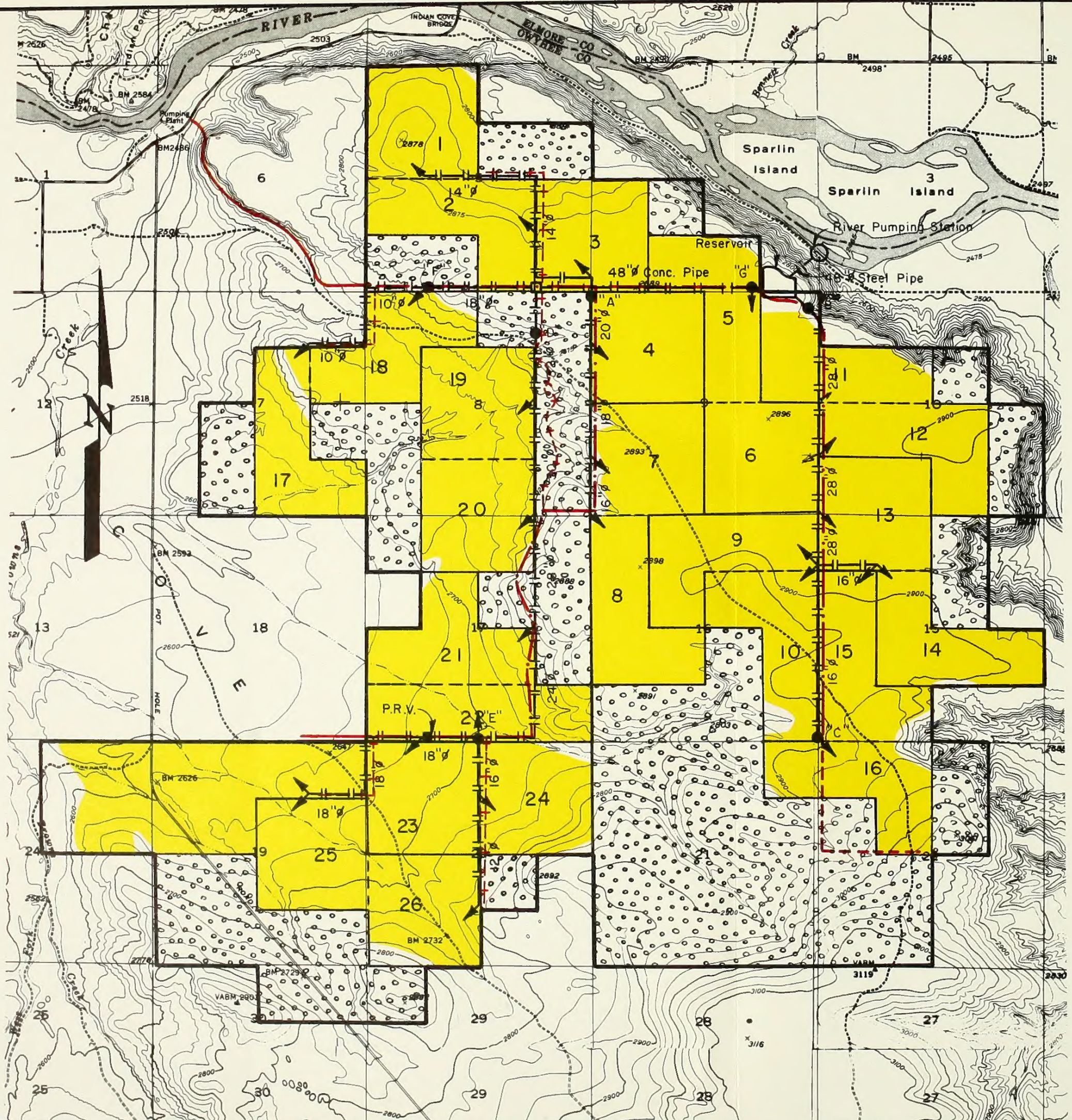
Drainage

Based on information developed during geologic investigations, and considering the method of water application, subsurface drainage is not expected to be a problem on the Indian Hills Project. However, some surface runoff, particularly from the steeper irrigated lands can be expected. This runoff will be controlled by construction of impoundments and intercepting ditches. In the larger drainages, water will be removed from the impoundment by 5 to 10 hp. pumping units and sprayed onto the adjacent wildlife lands. If this is not done, the impoundments become uneconomical due to increased size. Rock rip-rap spillways will be provided on the larger impoundments to pass flows from thunderstorm floods. A 1 percent occurrence flood has been used in proportioning the drainage control structure spillways. None of these impoundments will contain more than a few acre-feet of water and a failure would cause minimal downstream damage. Accordingly, larger and more costly spillway facilities are not indicated.












Pumping Power

Electrical power supplies for the project will be obtained from utilities in the area. In addition to furnishing electric power for the pumping plants, it is anticipated that the utility will provide the necessary electrical power to farm homes.

The total energy requirements for pumping is estimated to average 9,685,000 kilowatt hours annually. Of this, 6,810,000 kilowatt hours would be required at the main pumping plant and 2,875,000 will be used at the booster pumping plants.



LEGEND

- 2 Number Indicate Farm Unit
-  Wildlife Area
-  Lands to be Irrigated
-  Main Pump Station
- "A" ● Pump Station
-  Stand Pipe
-  Pressure Relief Valve
-  Farm Unit Turn Outs
-  Pipeline
-  24' Access Road
-  24' Combined Access & Service Road
-  Future 24' Roadway
-  14' Service Road

INDIAN HILLS IRRIGATION
PROJECT

PROJECT
MAP

APPENDIX 1-3

NATIONAL REGISTER CRITERIA (FROM 36 CFR 800)

(a) "National Register Criteria" means the following criteria established by the Secretary of the Interior for use in evaluating and determining the eligibility of properties for listing in the National Register: The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association and:

(1) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(2) That are associated with the lives of persons significant in our past; or

(3) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(4) That have yielded, or may be likely to yield, information important in prehistory or history,

(b) Criteria considerations. Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

(1) A religious property deriving primary significance from architectural or artistic distinction or historical importance;

(2) A building or structure removed from its original location but which is the surviving structure most importantly associated with a historic person or event;

(3) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life;

(4) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events;

(5) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration

master plan, and when no other building or structure with the same association has survived;

(6) A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance; or

(7) A property achieving significance within the past 50 years if it is of exceptional importance.

SECTION 106 OF THE NATIONAL HISTORIC
PRESERVATION ACT OF 1966 (PUBLIC LAW 89-655; 80 STAT. 915)

Sec. 106. The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or Federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.

APPENDIX 1-4

CULTURAL RESOURCE SURVEY STANDARD PROCEDURES

Prior to allowance of farming or any related construction activities, all land under consideration for agricultural development would undergo intensive cultural resource inventory. Components of development requiring site-specific surveys and evaluations include, but are not limited to the following: farm units, pump station sites, roads, powerlines, irrigation canals and pipelines, fences and gravel source pits. The evaluation process may include test excavations if recommended by a qualified cultural resource specialist. Following evaluation of the cultural resources, the State Historic Preservation Office and a BLM cultural resource specialist will jointly identify properties which are potentially eligible for listing in the National Register of Historic Places. A determination of their eligibility will then be sought from the Heritage Conservation and Recreation Service (see Appendix 1-3 for National Register Criteria of eligibles). The Advisory Council on Historic Preservation will then be consulted regarding the properties determined to be eligible for inclusion in the National Register.

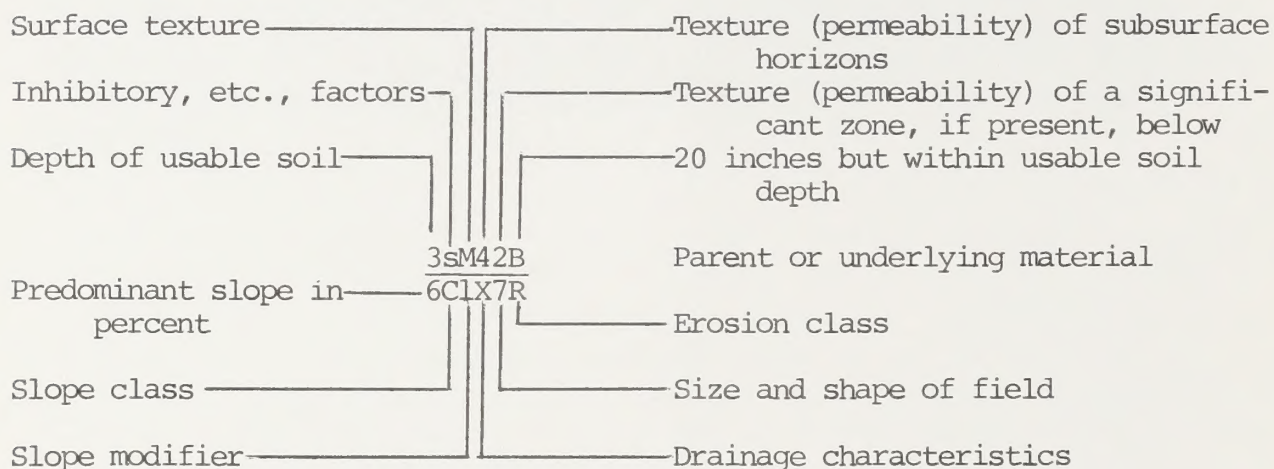
APPENDIX 2-1

Criteria Used In Classifying Soils

SOIL SURVEY LEGEND

The procedure-legend here outlined is designed to record the patterns and differences of physical soil characteristics as they occur across a given landscape. Such data is to provide a reference point from which interpretations may be made that are critical to the use and management of the soils resource.

Soils are recognized and are to be mapped in accordance with the approved legend. The physical characteristics of individual soil profiles will be examined and coded in a manner to reflect: depth, texture, permeability, slope class, and erosion where significant erosion has occurred. Modifying inhibitory or special feature factors to identify one unit from another and/or which affect use and management of the land will be utilized and made part of the coded symbol. Symbol-fractional-forms to be utilized in order of preference as they "fit" a given delineation are:



or: 3sM42B/6ClX7R

Soil Depth

The depth of the soil refers to the depth of the solum or the layers that are readily penetrated by plant roots or the depth to some layer that would restrict root penetration. Five depths are recognized:

<u>Symbol</u>	<u>Descriptive Team</u>	<u>Range</u>
1	Very deep	Over 60 inches
2	deep	30-60 inches
3	Moderately deep	20-36 inches
4	Shallow	10-20 inches
5	Very shallow	0-10 inches

Soil Textures

The following textural classes will be recognized, grouped, and coded to reflect surface and subsurface characteristics. Together, these factors will be utilized as a measure of soil permeability. Textured classes grouped in each separation are:

<u>Surface Texture Symbol</u>	<u>Subsurface Texture Symbol</u>	<u>Descriptive Term</u>	<u>Included Textural Classes</u>
F	1	Fine	Clay, silty clay, stony clay, sandy clay
H	2	Moderately fine	Silty clay loam, sandy clay loam, clay loam
M	3	Medium	Silt, silt loam, stony loam, gravelly loam, loam, very fine sandy loam
L	4	Light	Fine sandy loam, sandy loam, loamy fine sand
C	5	Coarse	Loamy coarse sand, very fine sand, fine sand, sand, coarse sand, very coarse sand, gravel

Inhibitory Factors

Inhibitory factors are shown by lower case letters following the profile depth code. Combination of factors are made when necessary to express all inhibitory factors. The following are those inhibitory factors to be recognized.

Saline/Alkali - Such soils contain sufficient salts so distributed in the profile that they limit or restrict growth of most crop plants. A saline-alkali soil has either so high a degree of alkalinity (pH 8.6 or higher), or so high a percentage of exchangeable sodium (15 per cent or higher), or both, that the growth of most plants is reduced. These conditions may exist at the soil surface, throughout the profile, at depth within the profile, and occur sporadically as "slick spots" across the landscape or as extensive tracts.

Five occurrences or intensities of saline/alkali conditions will be recognized:

<u>Code</u>	<u>Description</u>
a ₁	Moderate saline/alkaline condition--growth of most crops is moderately affected and less tolerant plants are seriously affected. The pH ranges from 8.6 to 9.0.
a ₂	Severe saline/alkaline condition--growth of only salt and alkali tolerant plants is possible. The pH will exceed 9.0.

- a₃ Saline/alkaline subsoil--soils having the surface layers relatively free of salt or alkali but which have an accumulation of salt and alkali in the subsoil. Such material has been leached to a depth as to not affect crop production unless poorly managed. Accumulations at 20 inches or more.
- a₄ Saline/alkali slick spots--this situation appears on the land as "slick spots" having "pigmy" or thin B horizon development correctable with normal tillage operations. Land surface involved exceeds 15 per cent of total area.
- a₅ Saline/alkali complex--this complex appears on the land as strongly developed B horizons requiring extensive and/or special tillage or other practices to modify profile problems (deep plowing, etc.). Land surface involved exceeds 15 per cent of total area.

Lime - Lime content sufficient to affect plant growth unfavorably.

<u>Code</u>	<u>Description</u>
z ₁	Concentrations in excess of 15 percent represented by 6 inches or greater depth of nodular and/or cap accumulations within 8 to 20 inches of the soil surface. No apparent restriction of root and/or water penetration.
z ₂	Concentrations in excess of 15 percent represented by 6 inches or greater depth nodular and/or cap accumulations within 0 to 8 inches of the soil surface. Or, slight restriction of root and water penetration at 0 to 20 inches as evidenced by inextensive root-matting.

Gravelly and Stony--Fragments of sufficient size and amounts significantly influence plant growth by creating poor soil-air moisture relationships and/or limits or restricts cultivation, planting, and harvest of crops.

<u>Code</u>	<u>Description</u>
g ₁	Gravelly--20 to 40 percent of land surface is covered and/or upper soil profile (20 inches) is composed of gravels from 2 mm's to 4 inches in diameter.
g ₂	Very gravelly--40 to 75 percent of land surface is covered and/or upper soil profile (20 inches) is composed of gravels from 2 mm's to 4 inches in diameter.
s ₁	Stony--Sufficient stones to interfere with tillage but not to make intertilled crops impracticable. (If stones are 1 foot in diameter and about 10 to 30 feet apart, they occupy about 0.1 to 1.5 percent of the surface, and there are about 1.5 to 25 cubic yards per acre-foot.)

- s₂ Very stony--sufficient stones to make tillage of inter-tilled crops impracticable, but the soil can be worked for hay crops or improved pasture if other soil characteristics are favorable. (If stones are 1 foot in diameter and about 5 to 10 feet apart, they occupy about 0.1 to 3 percent of the surface, and there are about 1.5 to 50 cubic yards per acre-foot.)
- r Extremely gravelly and/or stony condition in excess of foregoing conditions.

Overflow--Damaging overflow either as the result of stream action or as overland flow will be recorded as follows:

<u>Code</u>	<u>Description</u>
f ₁	Damaging overflow, occasional and slight. Frequency: 1 to 2 times in 10 year period.
f ₂	Damaging overflow, frequent and severe. Frequency: 3 to 8 times in 10 year period.

Wetness--Additional or excess water in the soil profile of sufficient degree to effect the normal function of the profile in production of crops. These degrees of wetness will be recognized:

<u>Code</u>	<u>Description</u>
w ₁	Choice of crops limited due to delayed drainage and warming of soil in the spring. Evidence (mottling) or water table if found occurs in lower soil profile.
w ₂	Choice of crops is seriously affected due to high water table and delay in drainage and warming of the soil in the spring. Evidence of a water table is found near soil surface with characteristics mottling occurring within major root zone depth.
w ₃	Choice of crops limited to those which can withstand a shallow water table throughout the growing season. The water table is at or near the surface during wetter part of year.

Parent and/or Underlying Materials

A	Acid igneous rock	R	Indurated hardpan
B	Basic igneous rock	S	Semi-consolidated material
D	Unconsolidated materials		
H	Aeolian sand	V	Lacustrine material
L	Loess	X	Recent alluvium
Q	Sand and gravel	Y	Clay

Slope

Steepness or gradient of the land is measured by use of an appropriate hand level and recorded in the denominator of the composite symbol. The dominant slope for each delineated area is recorded in percent in addition to the appropriate slope class group. Grouping is as follows:

<u>Code</u>	<u>Limits</u>
A	0-2
B	2-4
C	4-7
D	7-12
E	12-20
F	20 percent plus

Modifiers of Slope--Slope characteristics beyond that of gradient will be known by arabic numeral following slope class code. Three categories will be recognized:

<u>Code</u>	<u>Description</u>
1	Gently undulating land surface requiring a "cut and fill" operation of minimal amount. Surface relief varies from a 4 to 8 inch elevation difference from a level plane (0 to 500 cubic yards excavation per acre required).
2	Moderately undulating land surface requiring greater "cut and fill" operations. Surface relief varies from a 8 to 16 inch elevation difference from a level plane (500 to 1,000 cubic yards excavation per acre required).
3	Strongly undulating land surface requiring extensive "cut and fill" operations. Surface relief varies from a 16 to 24 inch elevation from a level plane. (1,000 to 1,465 cubic yards excavation per acre required).

Drainage--Soil depth, structure, topographic features, and underlying strata effect and compound natural drainage patterns. Under "normal" or natural conditions drainage is satisfactory. However, under an irrigated, agricultural situation, drainage problems may arise. Accordingly, three categories are recognized and will be mapped as:

<u>Code</u>	<u>Description</u>
X	Soil and topographic conditions such that limited drainage requirements are likely to occur. Relatively, simple and inextensive corrective measures will overcome the problem.

- Y Soil and topographic conditions such that significant drainage requirements are likely to occur. Coordinated and extensive corrective measures will be necessary to overcome the problem.
- Z Soil and topographic conditions such that excessive drainage requirements are likely to occur. Subsurface water is evidenced by mottling (mapped under wetness factor); and, although this may have beneficial effects upon pasture, etc., it will have detrimental effect upon irrigated crops and would require extensive measures to correct the problem.

Size and Shape of Field--This factor can become an important criteria to irrigation layout. Although sprinkler systems are more or less independent of field size and shape, surface irrigation methods are predicated upon such limits. Accordingly, three criteria are established:

<u>Code</u>	<u>Description</u>
7	600 foot minimum runs--10 acre minimum size
8	330 foot minimum runs-- 7 acre minimum size
9	220 foot minimum runs-- 3 acre minimum size

Erosion

Erosion class is shown in the mapping symbol by placing an arabic numeral or letter following the size and shape of field designation. The erosion will not be included in the symbol unless it is significant. Only two classes of erosion will be mapped. They are coded as follows:

<u>Code</u>	<u>Description</u>
2	Active water erosion evident as indicated by evident sheet, rill, and gully erosion.
R	Active wind erosion evident as indicated by "blowout" or "dune" areas of removal and/or accumulation.

Land Cover

These symbols are not a part of the composite symbol, but are placed as appropriate to record land cover to a 10-acre tract.

Land cover is confined to 5 classes. The following code will be used as required with a dashed(--) line utilized to separate various land cover occurring within a single delineation.

<u>Code</u>	<u>Description</u>
21	Native perennial grasses
22	Reseeded perennial grasses
23	Annual grasses
24	Sagebrush
25	Other shrubs

Miscellaneous

Other physical features (road, telephone, etc.) will be mapped and recorded in accordance with legend in Soil Survey Manual, Misc. Pub. No. 18.

Guide For Placing Bruneau Desert Soils
Into Land Capability Classes (Irrigable)

Capability Class Subclass	I e,s	II e,s	III e,s	VI All
Solum Depth	36 inches	20-36 inches	10-20 inches	Less than 10 inches
Surface Texture	v ^f sl-sicl	lfs-sicl	lfs-c	All
AWC-in/profile	5.0+	5.0-3.0 in.	3.0-2.0 in.	Less than 10 inches
Surface texture (Permeability- in/hour)	2,3,4 (0.2-5.0in.)	1,2,3,4,5 (0.05-10.0in.)	1,2,3,4,5 (0.05-10.0in.)	All All
Saline/Alkali	a ₃ ,a ₄	a ₁ ,a ₃	a ₂ ,a ₅	All
Lime ^{1/}	None, z ₁	z ₂	All	All
Gravel	None, g	g	r	All
Stone	None	s ₁	s ₂	All
Overflow	None, f ₁	f ₂	All	All
Drainage ^{2/}	X	Y	Z	All
Wetness	None, W ₁	W ₂	W ₃	All
Slope class Slope Modifier	AB 1	ABC 2	ABCDE 3	More than E class All
Erosion	None	2, R	2, R	All
F.F.D. (32°F)	140-110 days & can mature all common crops except common field corn, or less than 110 days & can mature commercial potatoes.	110-80 days or cannot mature commercial potatoes on less than 80 days and can mature 2 cut- tings of alfalfa.	80-60 days or have difficul- ty to mature cuttings of alfalfa or less than 60 days & can mature barley and seed potatoes.	Less than 60 days

^{1/} Lime, drainage, slope modifier, and size and shape of field are not so much a criterion of land capability as they are hazards and/or problems associated with production. However, lime, drainage, and slope modifier are included as a guide to land capability consideration.

^{2/} E slope class (12-20%)-applicable to sprinkler irrigation development only.

APPENDIX 2-2

ECONOMIC LAND CLASSIFICATION

Soil	Sugar Beets (tons)	Alfalfa (tons)	Potatoes Irish (CWT)	Wheat (BU)	Corn Silage (tons)	Corn Sweet (tons)	Pasture (AUM)	Barley (BU)	Apples (BU)	Field Corn (BU)	Alfalfa Seed (lbs.)
<u>Class 1</u>											
Turbyfill	28	6.5	410-415	85-88	25-27	7.0	17-19				
Power	28-30	7.0	375-395	90-95	26-27	8.0-8.5	18				
Harpt	28-30	6.5	370-380	110	25-26		15	120			
Lankbush		5.0		80	20		90				
Cencove	19-22	4.0-4.5	240-260	47-60	18-21	5.6-5.8	11-12				
Clems	18-26	4.5-5.5	345-380	75-90	18-23		18		540		
	26	5.7	357	84	23	7.0	16	105	540		
<u>Class 2</u>											
Minidoka	16-18	4.5	225-275	90-95			16-18	85-90			
Truesdale	28	5.5	375	80	17-19	6.5	9-10				
Lanktree	17	6.0-6.5		100-105	20-25		15-16	110-115			
Feltham	15-20	3.0-3.5		35-45	12		6-7			42-50	
Elijah		4.5-5.0	245-290		17-18	4.5-6		60-75			480-600
Clems	18	4.0	330	45	18		15		500		
Cencove		4.0	225	45	14	5.2	11				
Lankbush		4.5		70	18		14	80			
<u>Class 3</u>											
Chilcott		3.5-4.0		50-55	15-17		13-14	55-60			
Lankbush		2.5-2.0		55-65	18		9-14	65-75			
Cencove	13	3.5	210	42	12		9				
Clems		2.0-2.5			16		8				

Note - Yield figures based on irrigated crops from SCS Form 5's.

APPENDIX 2-3

CRITERIA USED IN CALCULATING SOIL EROSION

Erosion was calculated using the Musgrave Equation outlined in the BLM Manual 7317.22.

Sheet erosion by water may be estimated by using an equation developed by G. W. Musgrave. The equation is as follows:

$$E = FR(S/10)^{1.35} \times (L/72.6)^{0.35} \times (P/1.375)^{1.75}$$

- where:
- E - basic erosion in tons/acre/year
 - F - basic erosion rate of bare soil in tons/year
 - R - cover factor
 - S - average slope of contributing area in percent
 - L - length of longest contributing meander waterway in feet (field measurement)
 - P - maximum 2-year frequency, 30-minute rainfall in inches (extrapolate from revised Weather Bureau TP-40 data)

APPENDIX 2-4

SOIL AND WIND ERODABILITY CRITERIA

Relationship of Dry Soil Aggregates to Soil Erodability Index and Wind Erodability Group

<u>Wind Erodability</u> <u>(WEG)</u>	<u>Dry Soil Aggregates</u> 0.84 mm (percent)	<u>Soil Erodability</u> <u>Index (I) Group</u> (tons/acre/year)
1	0.5-1.5	340-280
2	5.0-15.0	180-117
3	16.0-34.0	113-67
4	15.0-35.0	117-65
4L	15.0-35.0	117-65
5	28.0-52.0	79-33
6	36.0-54.0	63-29
7	36.0-64.0	63-17
8	—	--

Wind erodability group (WEG) estimates should be based on dry soil aggregate sieving of the soil or of similar soil. If data are not available, estimates can be made using other properties as a guide.

Texture of the surface inch of soil has the greatest single influence of soil erodability and is used as a guide for estimating wind erodability groups.

SOURCE: Soil Conservation Service. Handbook for Interpretation,
Draft KKy, February 11, 1972.

Wind Erodability Soil Groups in the Northern Great Plains

For Use in Predicting Soil Losses by Wind and Determining Alternative Land Treatments for Soil Protection.

Wind erodability soil group 1/	Predominant soil classes
1	Very fine, fine, and medium sand and dune sand.
2	Loamy very fine, fine, and medium sands.
3	Very fine, fine, medium, and coarse sandy loams.
4	Clays, silty clays (subject to granulation).
5	Loams, sandy clay loams, sandy clays.
6	Silt loams, clay loams.
7	Silty clay loams, silt.
8	Soils subject to wetness, stoniness, etc., and not subject to wind erosion.

- 1/ Group 1. Mostly dune sand; single grain structure, vegetation difficult to establish; not suitable for cropland.
- Group 2. Mostly loamy sands; dry clod structure (as indicated by percentage of dry soil aggregates 0.84 mm. in diameter) is weak; requires a combination of intensive practices to control wind erosion.
- Group 3. Mostly sandy loams; dry clod structure moderately stable; requires at least two measures to control wind erosion in regions with high and intermediate climatic factor.
- Group 4. Mostly clays and silty clays; dry clod structure extremely variable due to concentration and swelling by freezing and thawing and wetting and drying; need a combination of at least two measures in regions with high and intermediate climatic factor.
- Group 5. Mostly loams and sandy clay loams; dry clod structure quite stable; a combination of at least two measures is needed in a region with high climatic factor.
- Group 6. Mostly silt loams and clay loams; dry clod structure stable; require a combination of at least two measures in a region with high climatic factor.
- Group 7. Mostly silty clay loams; dry clod structure extremely stable; usually a single practice is sufficient to control wind erosion.
- Group 8. Soils not suitable for crops because of wetness, stoniness, etc.

Source: Soil Conservation Service, Handbook for Interpretation, Draft Kky, February 11, 1972.

Guide for Estimating Wind Erodability Group (WEG) From Soil Textures

<u>Texture of Surface Inch*</u>	<u>WEG</u>
Very fine sand, fine sand and medium sand	1
Loamy Sand, loamy fine sand	2
Very fine sandy loam, fine sandy loam, sand loam	3
Clay, silty clay, noncalcareous clay loam and silty clay loam with more than 35 percent clay content	4
Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35 percent clay content	4L
Noncalcareous loam and silt loam with less than 20 percent clay content; noncalcareous clay loam with less than 35 percent clay content	6
Silt; noncalcareous silty clay loam with less than 35 percent clay content	7
Very wet or stony; not subject to wind erosion	8

*Samples were taken of the surface horizon and it is assumed that the surface inch of soil is the same texture.

SOURCE: Soil Conservation Service, Handbook for Interpretations, Draft KKy, February 11, 1972

APPENDIX 2-5

LIST OF INVERTEBRATE GROUPS FOUND IN THE IMPACT AREA

Insecta	<u>Tricorythodes</u>	<u>Athripsodes</u>
Coleoptera	<u>Isonychia</u>	<u>Brachycentrus</u>
Elmidae	<u>Paracloedes</u>	<u>Cheumatopsyche</u>
<u>Zaitzevia</u>	<u>Pseudocleon</u>	<u>Glossosoma</u>
Unknown adults	<u>Rhithrogena</u>	<u>Hydropsyche</u>
Diptera	Hemiptera	<u>Hydroptila</u>
Chironomidae	<u>Ambrysus</u>	<u>Neothremma</u>
larvae	<u>Graptocorixa</u>	<u>Neotrichia</u>
pupae	Lepidoptera	<u>Polycentropus</u>
Culicidae	<u>Paragyraetis</u>	<u>Psychomia</u>
Deuterophlebiidae	Odonata	Amphipoda
Empididae	<u>Argia</u>	<u>Hyallela azteca</u>
Simuliidae	<u>Coenagrion</u>	Gastropoda
<u>Simulium</u>	<u>Enallagma</u>	<u>Ferrissia</u>
Psychomyiidae	<u>Hyponcura</u>	<u>Gyraulus</u>
Rhagionidae	<u>Ophrogomphus</u>	<u>Lymnaea</u>
Ephemeroptera	Plecoptera	<u>Physa</u>
<u>Baetis</u>	<u>Acroneuria</u>	Arachnoidea
<u>Caenis</u>	<u>Classenia</u>	<u>Hydrocarina</u>
<u>Cynigmula</u>	<u>Isoplera</u>	Oligochaeta
<u>Epeorus</u>	<u>Nemoura</u>	Hirudinea
<u>Ephemerella</u>	<u>Pteronarcys</u>	<u>Helobdella</u>
<u>Hexagenia</u>	<u>Brachyptera</u>	Decapoda
<u>Stenonema</u>	Trichoptera	<u>Pacifasticus</u>

APPENDIX 2-6

PESTICIDE CONCENTRATIONS
AT MILNER POOL

PESTICIDE		NO. OF SAMPLES	RANGE		
			Low	High	
ALDRIN <u>1/</u>	mg/liter	20	.001	.003	
ALDRIN <u>2/</u>	mg/kg	1			.03
BHC <u>1/</u>	mg/liter	20	.001	.009	
BHC <u>2/</u>	mg/kg	1			.03
CHLORDANE <u>1/</u>	mg/liter	9	.005	.005	
CHLORDANE <u>2/</u>	mg/kg	1			.20
DDD <u>1/</u>	mg/liter	20	.001	.002	
DDD <u>2/</u>	mg/kg	1			.03
DDE <u>1/</u>	mg/liter	20	.001	.002	
DDE <u>2/</u>	mg/kg	1			.03
DDT <u>1/</u>	mg/liter	20	.001	.011	
DDT <u>2/</u>	mg/kg	1			.10
DIEIDRIN <u>1/</u>	mg/liter	20	.001	.006	
DIEIDRIN <u>2/</u>	mg/kg	1			.03
ENDRID <u>1/</u>	mg/liter	20	.001	.003	
ENDRID <u>2/</u>	mg/kg	1			.06
TOXEPHENE <u>1/</u>	mg/liter	9	.06	.06	
TOXEPHENE <u>2/</u>	mg/kg	1			2.0
HCHLR <u>1/</u>	mg/liter	20	.001	.001	
HCHLR <u>2/</u>	mg/kg	1			.03
HCHLR-EP <u>1/</u>	mg/liter	18	.001	.003	
HCHLR-EP <u>2/</u>	mg/kg	1			.03
ARO CIOR <u>1/</u>	mg/liter	5	.015	.015	
ARO CIOR <u>2/</u>	mg/kg	1			.50
LINDANE <u>1/</u>	mg/liter	9	.001	.001	
LINDANE <u>2/</u>	mg/kg	1			.03

APPENDIX 2-7

WILDLIFE SPECIES IN THE ES AREA

LIFE FORMS

Life form number	Reproduces	Feeds
1	in water	in water
2	in water	on ground, in shrubs and/or trees
3	on ground around water, on floating or emergent vegetation	in water, on ground, in shrubs and trees
4	in cliffs, caves, rims, and/or talus	on ground or in air
5	on ground associated with shrubs or grassland	on ground
6	on ground associated with agricultural fields	on ground
7	on ground	in shrubs, trees or in air
8	in shrubs	on ground, in water or in air
9	in shrubs	in shrubs, trees, or in air
10	primarily in deciduous trees	in shrubs, trees, or in air
11	primarily in conifers	in shrubs, trees, or air
12	in trees	on ground, in shrubs, trees, air, or in water
13	excavates own hole in a tree	on ground, in water, or in air
14	in a hole made by another species or naturally occurring	on ground, in water, or in air
15	underground burrow	on or under ground
16	underground burrow	in water, on ground, or in air
17	in association with man made structures	on ground or in air

RELATIVE ABUNDANCE SYMBOLS

- a - abundant: common species which is very numerous in suitable habitat.
- c - common: certain to be seen in suitable habitat.
- u - uncommon: present but not certain to be seen. May occur only locally.
- o - occasional: seen only a few times during a season.
- r - rare: not certain to be seen every year; may not be widely distributed.
- x - accidental: seen only once or twice, out of normal range.
- ** - present but current abundance unknown.

SEASONAL STATUS SYMBOLS

- M - migrant
- R - permanent resident
- S - summer resident
- W - winter resident

CLASSIFICATION SYMBOLS

- F - fur bearing animal
- G - game animal
- P - predatory animal
- * - indicates a sensitive species
- E - endangered species

BIRDS WHICH BREED IN THE AGRICULTURAL ES AREA;
 THEIR RELATIVE ABUNDANCE,
 SEASONAL STATUS, AND LIFE FORM(S)

Common Name	Scientific Name	Relative Abundance and Seasonal Status	Life Form
Eared Grebe	<u>Podiceps nigricolis</u>	rS	3
Western Grebe	<u>Aechmophorus occidentalis</u>	cS	3
Pied - billed Grebe	<u>Podilymbus podiceps</u>	uS	3
Double-crested Cormorant	<u>Phalacrocorax auritus</u>	uS	8
Great Blue Heron	<u>Ardea herodias</u>	cR	12
Black-crowned Night Heron	<u>Nycticorax nycticorax</u>	uS	7
American Bittern	<u>Botaurus lentiginosus</u>	uS	3
Canada Goose	<u>Branta canadensis</u>	cR	3
Mallard	<u>Anas platyrhynchos</u>	cR	3
Gadwall	<u>Anas strepera</u>	uS	3
Pintail	<u>Anas acuta</u>	cR	3
Blue-winged Teal	<u>Anas discors</u>	uS	3
Cinnamon Teal	<u>Anas cyanoptera</u>	cS	3
American Wigeon	<u>Anas americana</u>	uR	3
Northern Shoveler	<u>Anas clypeata</u>	uS	3
Redhead	<u>Aythya americana</u>	uS	3
Ruddy Duck	<u>Oxyura jamaicensis</u>	uS	3
Turkey Vulture	<u>Cathartes aura</u>	uS	4
Cooper's Hawk	<u>Accipiter cooperii</u>	rR	12
Sharp-shinned Hawk	<u>Accipiter striatus</u>	oS	12
Red-tailed Hawk	<u>Buteo jamaicensis</u>	cR	12,4
Swainson's Hawk	<u>Buteo swainsoni</u>	uS	12
Ferruginous Hawk	<u>Buteo regalis</u>	*uR	4,5
Golden Eagle	<u>Aquila chrysaetos</u>	cR	4
Marsh Hawk	<u>Circus cyaneus</u>	cR	5
Prairie Falcon	<u>Falco mexicanus</u>	cR	4
American Kestrel	<u>Falco sparverius</u>	cR	4,12
Bobwhite Quail	<u>Colinus virginianus</u>	cR	6
Valley Quail	<u>Lophortyx californicus</u>	cR	6
Mountain Quail	<u>Oreortyx pictus</u>	*uR	5

BIRDS WHICH BREED IN THE AGRICULTURAL ES AREA;
THEIR RELATIVE ABUNDANCE,
SEASONAL STATUS, AND LIFE FORM(S) (CONT.)

Common Name	Scientific Name	Relative Abundance and Seasonal Status	Life Form
Chukar	<u>Alectoris chukar</u>	cR	5
Hungarian Partridge	<u>Perdix perdix</u>	uR	6
Sage Grouse	<u>Centrocercus urophasianus</u>	uR	5
Pheasant	<u>Phasianus colchicus</u>	cR	6
Virginia Rail	<u>Rallus limicola</u>	oR	3
American Coot	<u>Fulica americana</u>	cR	3
Killdeer	<u>Charadrius vociferus</u>	cR	3
Wilson's Snipe	<u>Capella gallinago</u>	uS	3
Long-billed Curlew	<u>Numenius americanus</u>	*uS	5
Willet	<u>Cataprophorus semipalmatus</u>	uS	3
Spotted Sandpiper	<u>Actitis macularia</u>	uS	3
American Avocet	<u>Recurvirostra americana</u>	cS	3
Black-necked Stilt	<u>Himantopus mexicanus</u>	uS	3
Wilson's Phalarope	<u>Steganopus tricolor</u>	uS	3
California Gull	<u>Larus californicus</u>	cS	3
Ring-billed Gull	<u>Larus delawarensis</u>	cR	3
Franklin's Gull	<u>Larus pipixcan</u>	rS	3
Forester's Tern	<u>Sterna forsteri</u>	rS	3
Caspian Tern	<u>Hydroprogne cuspidata</u>	oS	3
Rock Dove	<u>Columba livia</u>	cR	4
Mourning Dove	<u>Zenaidura macroura</u>	cR	5, 8
Yellow-billed Cuckoo	<u>Coccyzus americanus</u>	xS	9
Barn Owl	<u>Tyto alba</u>	cR	4, 14, 17
Western Burrowing Owl	<u>Speotyto cunicularia</u>	*uR	15
Great Horned Owl	<u>Bubo virginianus</u>	cR	4, 12
Long-eared Owl	<u>Asio otus</u>	uR	8, 12
Screech Owl	<u>Otus asio</u>	oR	14
Short-eared Owl	<u>Asio flammeus</u>	uR	5, 6
Common Nighthawk	<u>Cordeiles minor</u>	cS	7
Poor-will	<u>Phalaeoptilus nuttalli</u>	uS	7
Calliope Hummingbird	<u>Stellula calliope</u>	uS	8

BIRDS WHICH BREED IN THE AGRICULTURAL ES AREA;
 THEIR RELATIVE ABUNDANCE,
 SEASONAL STATUS, AND LIFE FORM(S) (CONT.)

Common Name	Scientific Name	Relative Abundance and Seasonal Status	Life Form
Black-chinned Hummingbird	<u>Archilochus alexandri</u>	uS	8
White-throated Swift	<u>Aeronautes saxatalis</u>	uS	4
Belted Kingfisher	<u>Megasceryl alcyon</u>	uS	16
Common Flicker	<u>Colaptes auratus</u>	cR	13
Lewis Woodpecker	<u>Asyndesmus lewis</u>	uR	13
Eastern Kingbird	<u>Tyrannus tyrannus</u>	uS	8
Western Kingbird	<u>Tyrannus verticalis</u>	cS	12
Willow Flycatcher	<u>Empidonax traillii</u>	US	8
Dusky Flycatcher	<u>Empidonax oberholseri</u>	oS	8
Olive-sided Flycatcher	<u>Nuttallornis borealis</u>	uS	10
Says Phoebe	<u>Sayornis saya</u>	uS	4
Gray Flycatcher	<u>Empidonax wrightii</u>	uS	8
Western Wood Pewee	<u>Contopus sordidulus</u>	cS	12
Horned Lark	<u>Eremphila alpestris</u>	aR	5
Violet-green Swallow	<u>Tuohycineta thalassina</u>	uS	4
Bank Swallow	<u>Riparia riparia</u>	cS	16
Barn Swallow	<u>Hirundo rustica</u>	cS	4, 17
Cliff Swallow	<u>Petrochelidon pyrohonta</u>	cS	4, 17
Rough-winged Swallow	<u>Stelgidopteryx rufficollis</u>	cS	16
Black-billed Magpie	<u>Pica pica</u>	aR	8, 12
Common Crow	<u>Corvus brachyrhynchos</u>	uR	12
Common Raven	<u>Corvus corax</u>	cR	4
Black-capped Chickadee	<u>Parus atricapillus</u>	uR	14
Winter Wren	<u>Troglodytes troglodytes</u>	uR	3
Long-billed Marsh Wren	<u>Telmatodytes palustris</u>	cR	3
Canyon Wren	<u>Ctaherpes mexicanus</u>	cR	4
Rock Wren	<u>Salpinctes obsoletus</u>	cR	4
Sage Thrasher	<u>Oreoscoptes montanus</u>	cS	8
American Robin	<u>Turdus migratorius</u>	uR	8
Loggerhead Shrike	<u>Lanius ludovicianus</u>	uR	8

BIRDS WHICH BREED IN THE AGRICULTURAL ES AREA;
 THEIR RELATIVE ABUNDANCE,
 SEASONAL STATUS, AND LIFE FORM(S) (CONT.)

Common Name	Scientific Name	Relative Abundance and Seasonal Status	Life Form
Starling	<u>Strunus vulgaris</u>	aR	14, 17
Warbling Vireo	<u>Vireo gilvus</u>	uS	12
Solitary Vireo	<u>Vireo solitarius</u>	oS	12
Yellow-rumped Warbler	<u>Dendruica coronata</u>	cS	12
Yellow Warbler	<u>Dendroica petechia</u>	cS	9
Orange-crowned Warbler	<u>Vermivora celata</u>	oS	7
Wilson's Warbler	<u>Wilsonia pusilla</u>	cS	5
MacGillivray's Warbler	<u>Opornis tolniei</u>	uS	8
Common Yellowthroat	<u>Geothlypis trichus</u>	uS	3
Yellow-breasted Chat	<u>Icteria virens</u>	uS	9
House Sparrow	<u>Passer domesticus</u>	aR	14, 17
Bobolink	<u>Dolichonyx oryzivorus</u>	rS	5
Yellow-headed Blackbird	<u>Xanthocephalus xanthocephalus</u>	cS	8
Red-winged Blackbird	<u>Agelaius phoeniceus</u>	aR	8
Northern Oriole	<u>Icterus galbula</u>	uS	10
Brewer's Blackbird	<u>Euphagus cyanocephalus</u>	aR	8
Brown-headed Cowbird	<u>Molthrus ater</u>	uS	8
Western Meadowlark	<u>Sturnella neglecta</u>	aR	5
Blue Grosbeak	<u>Guiraca caerulea</u>	rS	8
Laxuli Bunting	<u>Passerina amoena</u>	cS	8
House Finch	<u>Carpodacus mexicanus</u>	cR	10
American Goldfinch	<u>Spinus tristis</u>	cR	9
Rufous-sided Towhee	<u>Pipilio erythrophthalmus</u>	uS	8
Brewer's Sparrow	<u>Spizella breweri</u>	cS	8
Vesper Sparrow	<u>Poocetes gramineus</u>	cS	5
Savannah Sparrow	<u>Passerculus sandwichensis</u>	uS	5
Lark Sparrow	<u>Chondestes grammacus</u>	cS	5
Sage Sparrow	<u>Amphispiza belli</u>	cS	8
Song Sparrow	<u>Melospiza melodia</u>	cR	8
Black-throated Sparrow	<u>Amphispiza bilineata</u>	cS	8

BIRDS WHICH DO NOT BREED IN, BUT DO OCCUR WITHIN THE ES AREA

<u>Common Name</u>	<u>Scientific Name</u>	Relative Abundance and		<u>Habitat Preference</u>
		<u>Seasonal Status</u>		
Common Loon	<u>Gavia immer</u>	oM		Lakes, ponds, rivers
Horned Grebe	<u>Podiceps auritus</u>	oM		Lakes, ponds
White Pelican	<u>Pelecanus erythrorhynchos</u>	uM		Lakes, ponds, marshes
Great Egret	<u>Casmerodius albus</u>	oM		Marshes, irrigated lands, ponds
Snowy Egret	<u>Leucophoyx thula</u>	uM		Marshes, irrigated lands, ponds
White-faced Ibis	<u>Plegadis chihi</u>	rM*		Marshes
Whistling Swan	<u>Olor columbianus</u>	uM		Water, marshes, irrigated lands
White-fronted Goose	<u>Ansar albifrons</u>	rM		Lakes, streams, marshes
Snow Goose	<u>Chen caerulescens</u>	oM		Lakes, rivers
Ross Goose	<u>Chen rossii</u>	rM		Lakes, rivers
Green-winged Teal	<u>Anus carolinensis</u>	cW		Marshes, lakes, ponds, rivers
Wood Duck	<u>Aix sponsa</u>	oM		Streams, river
Ring-necked Duck	<u>Aythya collaris</u>	uM		Marshes, ponds, rivers
Canvasback	<u>Aythya valisineria</u>	uW		Marshes, lakes, rivers
Lesser Scaup	<u>Aythya affinis</u>	uM		Marshes, ponds, lakes
Common Goldeneye	<u>Bucephala clangula</u>	uW		Lakes, rivers
Barrows Goldeneye	<u>Bucephala islandica</u>	rM		Lakes, ponds, rivers
Bufflehead	<u>Bucephala albeola</u>	uW		Lakes, ponds, rivers
Hooded Merganser	<u>Lophodytes cucullatus</u>	oW		Lakes, ponds, rivers
Common Merganser	<u>Mergus merganser</u>	cW		Lakes, ponds, rivers
Red-breasted Merganser	<u>Mergus serrator</u>	rM		Lakes, ponds, rivers
Goshawk	<u>Accipiter gentilis</u>	oW		Riparian
Rough-legged Hawk	<u>Buteo lagopus</u>	cW		Shrub/grassland, grassland, farmland
Bald Eagle	<u>Haliaeetus leucocephalus</u>	EuW		Lakes, rivers, shrub/grassland
Osprey	<u>Pandion haliaetus</u>	uM*		Rivers, lakes, riparian
Merlin	<u>Falco columbarius</u>	oW*		Riparian, shrub/grassland, grassland
Sandhill Crane	<u>Grus canadensis</u>	uW		Grassland, agricultural fields, marshes
Sora	<u>Porzana carolina</u>	uM		Marshes
Semipalmated Plover	<u>Charadrius semipalmatus</u>	rM		Marshes
Black-bellied Plover	<u>Squatarola squatarola</u>	rM		Marshes
Solitary Sandpiper	<u>Tringa solitaria</u>	oM		Marshes, ponds

BIRDS WHICH DO NOT BREED IN, BUT DO OCCUR WITHIN THE ES AREA (CONT.)

<u>Common Name</u>	<u>Scientific Name</u>	Relative Abundance and		<u>Habitat Preference</u>
		<u>Seasonal Status</u>		
Greater Yellowlegs	<u>Totanus melanoleucus</u>	cM		Marshes, streams, ponds
Lesser Yellowlegs	<u>Totanus flavipes</u>	uM		Marshes, ponds
Pectoral Sandpiper	<u>Erolia melanotos</u>	rM		Marshes
Baird's Sandpiper	<u>Erolia bairdii</u>	oM		Marshes, ponds
Least Sandpiper	<u>Erolia minutilla</u>	oM		Marshes, ponds
Long-billed Dowitcher	<u>Limnodromus scolopaceus</u>	uM		Marshes, ponds
Semipalmated Sandpiper	<u>Ereunetes pusillus</u>	oM		Marshes, ponds
Western Sandpiper	<u>Ereunetes mauri</u>	cM		Marshes, ponds
Marbled Godwit	<u>Limosa Fedoa</u>	uM		Marshes, ponds
Northern Phalarope	<u>Lobipes lobatus</u>	rM		Lakes, ponds, marshes
Black Tern	<u>Chlidonias niger</u>	rM		Marshes, ponds, lakes
Snowy Owl	<u>Nyctea scandiaca</u>	rW		Grassland, shrub/grassland
Rufous Hummingbird	<u>Selasphorus rufus</u>	cM		Riparian, shrub/grass
Vaux's Swift	<u>Chaetura vauxi</u>	oM		Open sky, cliffs
Hairy Woodpecker	<u>Dendrocopos villosus</u>	uW		Riparian
Downy Woodpecker	<u>Dendrocopos pubescens</u>	uW		Riparian
Black Phoebe	<u>Sayornis nigricans</u>	xM		Canyons, farmlands, riparian
Tree Swallow	<u>Iridoprocne bicolor</u>	uM		Riparian, marshes
Bushtit	<u>Psaltriparus minimus</u>	oW		Shrub/grassland, riparian
House Wren	<u>Troglodytes aedon</u>	oM		Riparian, shrub/grassland
Townsend's Solitaire	<u>Myadestes townsendi</u>	oW		Canyons, shrub/grassland
Western Bluebird	<u>Sialia mexicana</u>	uM		Shrub/grassland, riparian
Mountain Bluebird	<u>Sialia currucoides</u>	uM		Shrub/grassland
Golden-crowned Kinglet	<u>Regulus calendula</u>	uW		Canyons, shrub/grassland
Ruby-crowned Kinglet	<u>Regulus calendula</u>	uW		Shrub/grassland, riparian
Water Pipit	<u>Anthus spinoletta</u>	uM		Shrub/grassland
Bohemian Waxwing	<u>Bombycilla garrula</u>	oM		Shrub/grassland, riparian
Cedar Waxwing	<u>Bombycilla cedrorum</u>	uW		Agricultural fields
Northern Shrike	<u>Lanius excubitor</u>	uW		Riparian, shrub/grassland
Black and White Warbler	<u>Mniotilta varia</u>	oW		Shrub/grass, riparian
Townsend's Warbler	<u>Dendroica townsendi</u>	rM		Riparian
Nashville Warbler	<u>Vermivora ruficapilla</u>	rM		Riparian
		uM		Riparian

BIRDS WHICH DO NOT BREED IN, BUT DO OCCUR WITHIN THE ES AREA (CONT.)

<u>Common Name</u>	<u>Scientific Name</u>	Relative Abundance and		<u>Habitat Preference</u>
		<u>Seasonal Status</u>		
Tricolored Blackbird	<u>Agelaius tricolor</u>	rM		Marshes, agricultural land
Western Tanager	<u>Piranga ludoviciana</u>	uM		Riparian
Black-headed Grosbeak	<u>Pheucticus melanocephalus</u>	uM		Riparian, shrub/grassland
Evening Grosbeak	<u>Hesperiphona melanocephalus</u>	uW		Riparian
Snow Bunting	<u>Plectrophenax nevalis</u>	xW		Grassland
Pine Siskin	<u>Spinus pinus</u>	cW		Riparian, shrub/grassland
Gray-crowned Rosy Finch	<u>Leucosticte tephrocotis</u>	rW		Shrub/grassland
Common Redpoll	<u>Acanthis flammea</u>	oW		Shrub/grassland
Lapland Longspur	<u>Calcarius lapponicus</u>	rW		Grassland, agricultural fields
Dark-eyed Junco	<u>Junco hyemalis</u>	cW		Riparian
Harris Sparrow	<u>Zonotrichia querula</u>	rW		Shrub/grassland
White-crowned Sparrow	<u>Zonotrichia leucophrys</u>	cW		Shrub/grassland
White-throated Sparrow	<u>Zonotrichia albicollis</u>	rW		Shrub/grassland
Tree Sparrow	<u>Spizella arborea</u>	oW		Shrub/grassland

MAMMALS WHICH OCCUR IN THE ES AREA;
 THEIR CLASSIFICATION,
 RELATIVE ABUNDANCE AND LIFE FORM(S)

Common Name	Scientific Name	Classification	Relative Abundance	Life Form
Merriam Shrew	<u>Sorex marriami</u>		**	16
Vagrant Shrew	<u>Sorex vagrans</u>		**	16
Little Brown Bat	<u>Myotis lucifugus</u>		**	4,17
Fringed Bat	<u>Myotis thysanodes</u>		**	4,17
California Bat	<u>Myotis californicus</u>		**	4,17
Yuma Bat	<u>Myotis yumanensis</u>		**	4,17
Long-legged Bat	<u>Myotis volans</u>		**	4,17
Western Pipistrel	<u>Pipistrellus hesperus</u>		**	4,17
Spotted Bat	<u>Euderma maculatum</u>	*	**	4,17
Western Big-eared Bat	<u>Plecotus townsendi</u>		**	4,17
Pallid Bat	<u>Antrozous pallidus</u>		**	4,17
Raccoon	<u>Procyon lotor</u>	F	c	14
Longtail Weasel	<u>Mustela frenata</u>	P	c	15
Shorttail Weasel	<u>Mustela erminea</u>	P	u	15
Mink	<u>Mustela vison</u>	F	u	16
Badger	<u>Taxideu taxus</u>		c	15
Striped Skunk	<u>Mephitis mephitis</u>	P	c	15
Spotted Skunk	<u>Spilogale putorius</u>	P	u	4
River Otter	<u>Lutra canadensis</u>	*F	c	16
Red Fox	<u>Vulpes vulpes</u>	F	**	15
Coyote	<u>Canis latrans</u>	P	a	15
Bobcat	<u>Lynx rufus</u>	*F	c	4
Yellowbelly Marmot	<u>Marmota flaviventris</u>		c	4
Whitetail Antelope Squirrel	<u>Ammospermophilus leucurus</u>		c	15
Townsend Ground Squirrel	<u>Spermophilus townsendi</u>		u	15
Belding Ground Squirrel	<u>Spermophilus beldingi</u>		u	15
Least Chipmunk	<u>Eutamias minimus</u>		c	

MAMMALS WHICH OCCUR IN THE ES AREA;
THEIR CLASSIFICATION,
RELATIVE ABUNDANCE AND LIFE FORM(S) (CONT.)

Common Name	Scientific Name	Classification	Relative Abundance	Life Form
Townsend Pocket Gopher	<u>Thomomys townsendi</u>		**	15
Northern Pocket Gopher	<u>Thomomys talpoides</u>		c	15
Great Basin Pocket Mouse	<u>Perognathusparvus</u>		c	15
Ord Kangaroo Rat	<u>Dipodomys ordi</u>		c	15
Great Basin Kangaroo Rat	<u>Dipodomys microps</u>		**	15
Beaver	<u>Castor canadensis</u>	F	u	2,16
Western Harvest Mouse	<u>Reithrodontomys megalotis</u>		c	15
Deer Mouse	<u>Peromyscus maniculatus</u>		c	15
Canyon Mouse	<u>Peromyscus crinitus</u>		**	4
Northern Grasshopper Mouse	<u>Onychomys leucogaster</u>		u	15
Bushytail Woodrat	<u>Neotoma cinerea</u>		c	4
Desert Woodrat	<u>Neotoma lepida</u>		**	4
Sagebrush Vole	<u>Lagurus curtatus</u>		u	15
Mountain Vole	<u>Microtus montanus</u>		c	15
Longtail Vole	<u>Microtus longicaudus</u>		**	15
Muskrat	<u>Ondatra zibethicus</u>	F	c	16
Norway Rat	<u>Rattus norvegicus</u>		c	17
House Mouse	<u>Mus musculus</u>		c	17
Western Jumping Mouse	<u>Zapus rpiniceps</u>		**	15
Porcupine	<u>Erethizon dorsatum</u>		c	14
Blacktail Jackrabbit	<u>Lepus californicus</u>		a	5
Whitetail Jackrabbit	<u>Lepus townsendi</u>		u	5
Mountain Cottontail	<u>Sylvilagus nuttalli</u>	G	c	4,5
Pygmy Rabbit	<u>Sylvilagus idahoensis</u>	G	r	5
Mule Deer	<u>Odocoileus hemionus</u>	G	u	5
Pronghorn Antelope	<u>Antilocapra americana</u>	G	u	5

REPTILES WHICH OCCUR IN THE ES AREA;
THEIR RELATIVE ABUNDANCE AND LIFE FORM

Common Name	Scientific Name	Relative Abundance	Life Form
Leopard Lizard	<u>Crotaphytus wislizenii</u>	c	5
Collard Lizard	<u>Crotaphytus collaris</u>	u	4
Side-blotched Lizard	<u>Uta stansburiana</u>	a	5
Desert Horned Lizard	<u>Phrynosoma platyrhina</u>	c	5
Western Whiptail	<u>Cnemidophorus tigris</u>	a	5
Western Fence Lizard	<u>Sceloporus occidentalis</u>	c	4
Striped Whipsnake	<u>Masticophis taeniatus</u>	a	5
Racer	<u>Coluber constrictor</u>	u	5
Gopher Snake	<u>Pituophis meoanoleucus</u>	a	5
Long-nosed Snake	<u>Rhinocheilus lecontei</u>	o	5
Common Garter Snake	<u>Thamnophis sirtalis</u>	o	3
Western Terrestrial Garter Snake	<u>Thamnophis elegans</u>	u	3
Western Ground Snake	<u>Sonora semiannulata</u>	* o	15
Night Snake	<u>Hypsiglena torquata</u>	c	5
Western Rattlesnake	<u>Crotalus viridis</u>	a	5

AMPHIBIANS WHICH OCCUR IN THE ES AREA;
THEIR RELATIVE ABUNDANCE AND LIFE FORM

Common Name	Scientific Name	Relative Abundance	Life Form
Great Basin Spadefoot Toad	<u>Scaphiopus intermontanus</u>	a	2
Western Toad	<u>Bufo boreas</u>	x	2
Woodhouse's Toad	<u>Bufo woodhousei</u>	a	2
Chorus Frog	<u>Pseudacris triseriata</u>	u	2
Pacific Treefrog	<u>Hyla regilla</u>	a	2
Leopard Frog	<u>Rana pipiens</u>	u	2
Bull Frog	<u>Rana catesbeiana</u>	u	1
Long-toed Salamander	<u>Ambystoma macrodactylum</u>	u	2

APPENDIX 2-8

ABUNDANCE OF FISHES IN THE SNAKE RIVER REACH
OF THE ES AREA

TABLE A
ABUNDANCE OF FISHES IN UPPER SALMON FALLS, LOWER SALMON
FALLS AND BLISS RESERVOIR IN 1953-54. FROM IRVING AND
CUPLIN (1956).

GAME SPECIES	Percent by number	Number Collected
Mountain whitefish	6	284
Yellow perch	1	49
Rainbow Trout	1	41
Bluegill	/1	18
Brown bullhead	/1	4
Largemouth bass	/1	2
Green sunfish	/1	2
Redear sunfish	/1	1
Channel catfish	/1	1
	8	402
NON-GAME		
Sucker	37	1770
Utah chub	24	1124
Redside shiner	11	544
Northern squawfish	7	336
Chiselmouth	3	154
Carp	1	29
Sculpin	/1	3
Dace	/1	2
	92	4364

TABLE B

ABUNDANCE OF FISHES IN SECTION II OF THE SNAKE RIVER,
C.J. STRIKE RESERVOIR. FROM REID (1974), WITH DATA
FROM ALL SAMPLING SITES, SAMPLE DATES AND TYPES OF
GEAR COMBINED.

GAME SPECIES	PERCENT BY NUMBER	NUMBER CAPTURED
Largemouth Bass	25	1,207
Bluegill	10	481
Black Crappie	4	206
Yellow Perch	4	178
Bullhead	3	161
Pumpkinseed	3	139
Channel Catfish	2	87
Warmouth	1	39
Mountain Whitefish	1	30
Rainbow Trout	<1	14
Smallmouth Bass	<1	5
NON-GAME	52	2,547
Suckers (2 Species)	20	963
Carp	15	748
Northern Squawfish	6	292
Chiselmouth	4	214
Sculpin	3	128
Redside Shiner	<1	16
Pearmouth	<1	12
Dace	<1	5
	48	2,373

*Data from all sampling sites, sample dates and types of gear combined.

TABLE C

ABUNDANCE OF FISHES IN SECTION III OF THE SNAKE RIVER
FROM C.J. STRIKE DAME DOWNSTREAM TO THE SWAN FALLS
RESERVOIR FLOW LINE. FROM GOODNIGHT AND BOWLER (1973).

GAME SPECIES	Percent by number	Number captured
Mountain whitefish	25	54
Bluegill	3	45
Black crappie	3	44
Largemouth bass	1	NG
Rainbow trout	1	NG
Yellow perch	1	NG
Pumpkinseed	1	NG
Black bullhead	1	NG
	11.3%	161
NON-GAME		
Carp	41	585
Suckers	40	571
Northern squawfish	6	65
Sculpin	1	NG
Chiselmouth	1	NG
Peamouth	1	NG
	88.7%	1264
NG - not given in report		

TABLE D

ABUNDANCE OF FISHES IN SECTION IV OF THE SNAKE RIVER,
SWAN FALLS RESERVOIR. FROM SIGLER (1972) AND
GOODNIGHT AND BOWLER (1973).

GAME SPECIES	Sigler		Goodnight & Bowler	
	Percent by Number	Number collected	Percent by number	Number collected
Black crappie	1	6	5	84
Mountain whitefish	1	3	1	14
Smallmouth bass	1	1		0
Yellow perch	1	2		0
Channel catfish	1	1		0
Largemouth bass	1	1		0
	2	14	5.5	98
NON-GAME				
Suckers	45	305	36	647
Carp	34	231	21	384
Northern squawfish	16	109	32	551
Chiselmouth		0	3	61
Peamouth	3	19		0
Sculpin	1	1	2	25
Redseid shiner		0	1	18
	98	665	94.5	1686

TABLE E

ABUNDANCE OF FISHES IN SECTION V OF THE SNAKE RIVER, FROM SWANS FALLS DAM DOWNSTREAM TO CLARK'S ISLAND. FROM SIGLER (1972), GOODNIGHT AND BOWLER (1973) AND GIBSON (1974).

GAME SPECIES	Sigler		Goodnight & Bowler		Gibson	
	Percent by number	Number collected	Percent by number	Number collected	Percent by number	Number collected
Channel catfish	12	141	6	83	5	199
Black crappie	3	37	4	58	4	152
Smallmouth bass	6	74	3	43	13	568
Mountain whitefish	3	35	3	46	2	79
Pumpkinseed		0		0	/1	5
Redear sunfish		7		0		0
Bluegill	1	17			4	152
Black bullhead	/1	3	2	19		0
Largemouth bass	/1	3			2	80 ¹
Rainbow trout	/1	1				0
	26.5	318	18	249	29	1230
NON-GAME SPECIES						
Carp	22	267	24	329	38	1636
Largescale sucker	28	341	38	535	25	
Bridgelip sucker	7	89				
Northern squawfish	12	142	14	191	1	1048
Peamouth	1	6		0	/1	1
Chiselmouth	3	31	6	88	6	257
Sculpin	/1	3	/1	7		0
Redside shiner		0			1	38
Tadpole madtom	/1	1		0		0
	73.5	880	82	1150	71	3018

1 - Probably most were collected downstream out of Section V.

APPENDIX 2-9

LABOR FORCE AND EMPLOYMENT DEFINITIONS¹

Employment comprises wage and salary workers (including domestics and other private household workers), self-employed persons, and unpaid family workers who worked 15 hours or more during the survey week in family-operated enterprises. Employment in both agricultural and non-agricultural industries is included. Also included are persons temporarily absent from work because of illness, bad weather, vacation, labor management dispute, or because they were taking time off for various reasons, even if they were not paid by their employers for the time off. Employed persons holding more than one job are counted only once. Commuters are shown at their place of residence and not at their place of work.

Unemployment comprises all persons who did not work during the survey week, who made specific efforts to find a job, and who were available for work during the survey week. Also included as unemployed are those who were waiting to be called back to a job from which they had been laid off.

The Civilian Labor Force comprises the total of all civilians classified as employed or unemployed in accordance with the criteria described above.

Seasonal Adjustment refers to the correction of an economic time series for regularly recurring seasonal movement which can be estimated on the basis of past experience. By eliminating that part of the change which can be ascribed to usual seasonal variation, it is possible to observe the cyclical and other non-seasonal movements in the series. However, in evaluating deviations from the seasonal pattern--that is, changes in a seasonally adjusted series--it is important to note that seasonal adjustments is merely an approximation based on past experience. Seasonally adjusted estimates have a broader margin of possible error than the original data on which they are based, since they are subject not only to sampling and other errors but, in addition, are affected by the uncertainties of the seasonal adjustment process itself.

¹Idaho State Department of Employment, 1977. The Labor Force in Idaho. Boise, Idaho. p. 3.

APPENDIX 2-10

IDAHO POWER COMPANY HYDROELECTRIC FACILITIES

PLANT	NAME/PLATE RATING KW	YEAR COMPLETED LAST UNIT INSTALLED	TOTAL COST \$1,000,000	COST \$/KW
American Falls*	92,340	1978	3.3	122
Twin Falls	13,000	1935	.99	74
Clear Lakes	2,500	1937	.318	127
Shoshone Falls	12,380	1921	1.68	134
Thousand Springs	8,800	1912	1.16	132
Upper Salmon (A&B)	34,500	1947	5.85	170
Lower Salmon	60,000			
Malad (upper & lower)	20,700	1948	4.84	234
Bliss	75,000	1950	11.5	153
C..J. Strike	82,800	1952	17.87	216
Swan Falls	10,265	1918	1.66	162
Brownlee**	360,400	1959	68.19	191
Oxbow	190,000	1961	46.7	246
Hells Canyon	391,500	1976	65.8	168
Cascade	300	1926	.072	241
SUB TOTAL	1,354,485			

IDAHO POWER COMPANY THERMAL GENERATING PLANTS

Jim Bridger (Steam) Coal Fired	508,558	1971	171.1	338
Salmon Internal Combustion (Diesel)	6,825	1930	.79	116
Wood River Combustion Turbine (Natural Gas or Diesel)	50,000	1974	5.41	113
SUB TOTAL	565,383			
TOTAL	1,919,868			

* American Falls Plant upgraded from 26,500 KW to 92,340 to be completed in 1978.

** 225,000 KW peaking facility under construction (not included)

SOURCE: IVC, FPC form 12 for 1977

APPENDIX 2-11

IDAHO POWER COMPANY SALES OF ELECTRICITY BY RATE SCHEDULES

1977

RATE SCHEDULE NUMBER AND DESCRIPTION	KWH SOLD	REVENUE (\$)	AVERAGE NUMBER OF CUSTOMERS	KWH OF SALES PER CUSTOMER	REVENUE PER KWH SOLD
RESIDENTIAL SALES:					
Total - 3 schedules (1)	2,570,192,180	\$ 53,162,181	185,091	13,886	20.7
COMMERCIAL-INDUSTRIAL:					
11 General Service (small commercial)	74,899,500	3,301,784	13,583	5,514	44.1
12 General Service (small commercial)	1,000,128,000	22,513,060	10,453	95,679	22.5
19 Uniform Electric Rate contracts (large commercial)	928,555,760	11,617,094	85	10,924,185	12.5
24 Irrigation	1,661,064,420	26,546,295	10,136	163,878	16.0
27 Commercial (all electric)	209,599,050	4,304,783	1,531	136,903	20.5
Special Contracts All other	1,793,699,830	14,848,502	5	358,739,966	8.3
Commercial (2)	123,612,760	2,666,133	1,496	82,629	22.0
Total Commercial- Industrial	5,791,559,320	85,797,651	37,289	155,315	14.8
PUBLIC STREET & HIGHWAY LIGHTING:					
Total - 5 schedules (3)	22,723,320	1,021,485	187	121,515	45.0
SALES FOR RESALE:					
Sales, other utilities	832,286,836	9,694,011	6	138,731,139	16.3
Total	9,216,781,656	149,675,328	222,573	41,411	1.6

(1) Schedule 1, 15 and 45
 (2) Schedules 13, 14, 15, 25, 33, 34, 46.
 (3) Schedules 11, 12, 41, 42, 43.
 SOURCE: ITC, FPC Form 1 for 1977

IDAHO POPULATION AND EMPLOYMENT FORECAST

METHODOLOGY¹The Demographic Submodel

The Idaho Population and Employment Forecast (IPEF) demographic submodel produces forecasts of household and group quarters population at five-year intervals for each age, race, and sex group. Estimates of labor force and school enrollment for five grade categories are also made. In addition, numerical and percent population changes by age-sex groups are calculated as well as population age-sex pyramids if desired. The model centers around the Cohort-Survival technique and includes the ability to generate employment-related migration internally as well as allowing for exogenous migration. In addition, certain populations having unique characteristics can be forecast exogenously and entered into subsequent calculations.

Cohort-Survival Method

The demographic submodel is based on the Cohort-Survival method. This forecasting technique recognizes three major components of population change: (1) decreases in population due to deaths, (2) increases in population resulting from births, and (3) increases and decreases resulting from in-and-out-migration.

Migration

Employment-related migration is calculated by the model and is determined through a mechanism which balances available workers based on population with available jobs as forecast by the employment submodel. The process uses age-specific labor force participation rates (i.e., the proportion of population in an age-race-sex group that is working or seeking work), and the unemployment rate. The net migration necessary to balance labor force and employment is determined through successive iterations of the model.

Inputs to the Demographic Submodel

An overview of the data requirements of the demographic submodel provides an indication of the magnitude of the task.

Base year resident population by age, sex and race (if desired) are required. For the calculation of employment-related migration, it is necessary to specify the percent distribution of employment-related migrants by age, race (if desired), and sex. A method of determining this distribution is the "forward survival" technique which involves surviving the resident population for each group over a ten-year period between two censuses and determining the differences between the survivors

and the number of people enumerated in the later census. To account for migrants in the younger age groups, births during the ten-year period between censuses can be compared to the population aged 0 to 10 enumerated in a later census.

Certain forecast data must be prepared for each forecast interval. These include forecasts of retirement migration by age, sex, and race (if desired). In addition, a number of age-race-sex specific ratios must be forecast and supplied to the model as input. These include:

- 1) Survival rates;
- 2) Fertility rates;
- 3) Labor force participation rates;
- 4) School participation rates for nursery, kindergarten, elementary, high school, and college;
- 5) Group quarters rate (college dormitories and other group quarters);
- and 6) Household headship rates.

The Employment Submodel

The IPEF employment submodel uses an econometric approach to produce forecasts for up to 100 industry categories at five-year intervals. The model centers around the concept of the economic base, considering certain activities as basic or growth producing and other activities as nonbasic or dependent. The basic sector includes those activities that export their output outside the boundaries of the local economy and hence create a dollar inflow for the local area. The nonbasic or dependent activities, on the other hand, are essentially those that are oriented toward serving the local area.

Employment forecasts for basic activities are generated using historical growth patterns as determined by regression analysis and the expected growth of external markets as reflected in national rates of growth for each of the basic activities. Basic employment supplies the input necessary to forecast non-basic employment. The forecasts for the sectors of the employment submodel are summed and total employment is compared to labor force available within the demographic submodel. If total employment from the employment submodel and total labor force (from the demographic submodel) are not in balance, migration occurs within the demographic submodel and employment in all sectors are recalculated. This process continues until total employment and population converge.

The Series 2 projections are based on an extended employment data base. Instead of the original six years (1967 to 1972) of Bureau of Economic Analysis data, the model's data base consists of 16 years of data (1961 to 1976) provided by the Idaho Department of Employment.

Model Flexibility

While the model is capable of producing forecasts on a county basis in response to varying assumptions and data bases, it is also capable of analysis on a regional or state basis. Data bases for regions within the state and for the state can be constructed and used to make projections based upon assumptions and data relevant to the particular region or demographic study. Individuals interested in utilizing this capability

should contact the Department of Water Resources.

¹Meale, Robin and Jack Weeks. 1978. Population and Employment Forecast - State of Idaho Series 2-Projections 1975-2000. Department of Water Resources and Boise State University Center for Research, Grants and Contracts, Boise, Idaho.

APPENDIX 3-1

THE DYRAM MODEL

DYRAM, the model used in determining secondary impacts uses industry earnings in combination with a 20-sector industry expected transaction matrix, compiled from the national input-output table, in order to estimate net exports or imports by industry for the economy of a given area. Multipliers for each industry are computed; they refer to impacts on personal income, not business income. The reader is directed to The Annals of Regional Science, November 1975, pp. 44-50, for a detailed mathematical explanation of the model.

APPENDIX 3-2

FARM BUDGETS

The percentage of each crop in production was estimated as follows:

Potatoes	22%
Wheat	17%
Barley	17%
Alafalfa	6%
Beans	21%
Sugar Beets	17%
Total	<u>100%</u>

It should be noted that the percentage of production in potatoes most probably represents a "short run" (10-15 years) situation. Under this situation, the farmer is trying to maximize his earnings by extensive potato production. The long run averages (27 years) show that potatoes represent 10 percent of plantings.

It is unknown at this time whether potential entrymen will farm each unit independently or whether they will form cooperatives to purchase equipment. There is also a great variability between farm operations regarding depreciation and interest expenses. Because of the uncertainty and variability, the custom harvesting approach was used. This method approaches the true cost of farming and the custom rates include charges for labor, depreciation, and interest. The production costs used in the budget were derived from actual budgets in Owyhee County.

The three sets of prices represent 1976 and 1977 normalized prices and 1977 actual prices. Normalized prices are developed by the Water Resources Council and are used in all federal water projects. They are five year weighted averages. For instance, 1976 Normalized crop prices would be the average of the 5 years of weighted crop prices from 1972 through 1976. The 1977 actual data is from the Idaho Statistical Crop Reporting Service, USDA, and represents a weighted average of 12 months. The 28 year average is also from the Statistical Crop Reporting Service and is presented for comparison only (Table 1).

The energy section identifies four possible power rates for irrigation purposes. The first assumes reliance on impacts of power from British Columbia. This mill rate would be 16.5 mills/KWH. The second rate assumes Idaho Power Company (IPC), would participate in new power plants in other states (i.e., Boardman, Oregon Coal Fired thermal plant) in order to meet their demands. This rate would be 17.7 mills/KWH. The third rate assumes that Idaho Power would build their own power plants and sell off-peak power on the IPC system. This rate would be 20.1 mills/KWH. The fourth rate also assumes that IPC would build their own power plants but that off-peak power would be sold as surplus. This rate would be 21.2 mills per KWH. For a more detailed description of these four rate possibilities please refer to the energy section.

The annual pumping system cost reflects a water project designed to irrigate 5,000 acres and costing \$5,000,000. It is assumed that farmers will form an irrigation project and receive low interest money from the

Bureau of Reclamation. Ninety two dollars and forty three cents per acre represents the amortization payments on the pumping system and pipeline, roads, domestic water systems, etc. (similar to the Indian Hill Project described in Appendix 1-2) and includes interest.

Pumping costs were determined by using an average lift of 650 feet and an average distance from the river of 6 to 8 miles. Total dynamic head was calculated at 3,757 kilowatt hours per acre. The 3,757 KWH was multiplied by the four different mill rates to obtain pumping costs under each energy scenario (Table 2).

Tables 3 through 8 show the production costs per acre for the various crops. These tables do not include energy or pumping system costs.

Table 9 shows the costs and revenues of 320 acre farm assuming 1976 Normalized crop prices, 18.9 mills/KWH, and \$92.43/acre in pumping system costs. The other budgets can be obtained by substituting the various crop prices and energy costs as appropriate.

TABLE 1
CROP PRICES, REVENUE
320 ACRE FARM (310 ACRES ACTUALLY FARMED)

Crop	1976		1977		1977		28-Year Average Crop Prices
	Normalized Crop Prices	Total Revenue	Normalized Crop Prices	Total Revenue	Actual Crop Prices	Total Revenue	
Potatoes	\$ 3.76	\$74,617.20	\$ 3.52	\$69,854.40	\$ 2.70	\$53,581.50	\$ 3.55
Wheat	3.56	14,685.00	2.64	10,890.00	2.55	10,518.75	3.47
Barley	2.57	10,601.25	1.97	28,520.00	1.90	7,847.50	2.11
Alfalfa	45.87	4,793.42	50.10	5,235.45	50.46	5,273.07	44.07
Beans	18.55	23,651.25	17.26	22,006.50	20.50	26,137.50	15.37
Sugar Beets	31.84	31,840.00	28.52	28,520.00	22.14	22,140.00	26.82
TOTAL	-	\$160,188.12	-	\$142,982.60	-	\$125,488.32	-

TABLE 2

Mill Rate	Average Lift	Distance	Energy Costs		
			KWH/Acre	Cost/Acre	Cost/Farm
16.5	650 feet	6-8 miles	3757	\$61.99	\$19,217.06
17.7	650 feet	6-8 miles	3757	66.50	20,614.66
18.9	650 feet	6-8 miles	3757	71.01	22,013.10
20.1	650 feet	6-8 miles	3757	75.52	23,411.20
21.2	650 feet	6-8 miles	3757	79.65	24,691.50

TABLE 3

PRODUCTION COSTS
IN OWYHEE COUNTY FOR WHEAT

Operation	Times Over	Custom Cost per Acre	Total Cost per Acre
Plowing	1	\$ 8.38	\$ 8.38
Disking	1	3.21	3.21
Harrowing	2	1.67	3.34
Planting	1	3.20	3.20
Seed 3/6/ Fertilizing, Dry, Broadcast	80 lbs. 2	0.12 2.60	9.60 5.20
Fertilizer N	80 lbs.	0.00 0.30	0.00 24.00
Spraying 14/ Chemicals 11/7/ 2,4-D 2,4-D	2 2 2 pts. 6 pts.	2.71 0.00 1.02 1.02	5.42 0.00 2.04 6.10
Harvesting	.23/bu	17.94	17.94
Hauling	.05/bu	3.90	3.90
Storage 15/ For 6 mos.	.02/bu	0.00 9.36	0.00 9.36
SUBTOTAL COSTS			\$101.69
Interest at 8 percent for six months			4.07
SUBTOTAL PRODUCTION COSTS			\$105.76

SOURCE: Idaho Department of Water Resources

TABLE 4
 PRODUCTION COSTS
 IN OWYHEE COUNTY FOR BARLEY

Operation	Times Over	Custom Cost per Acre	Total Cost per Acre
Plowing	1	\$ 8.38	\$ 8.38
Disking	2	3.21	6.42
Harrowing	2	1.67	3.34
Planting	1	3.20	3.20
Seed 3/6/1	1.5 bu	5.95	8.90
Fertilizing, Dry, Broadcast	2	2.60	5.20
Fertilizer 1/ N	80 lbs.	0.00	0.00
Spraying 14/ Chemicals 11/7	2	0.30	24.00
2,4-D	2 pts.	2.71	5.42
2,4-D	6 pts.	0.00	0.00
Combine 17/ Hauling	.2 bu	1.02	2.04
Storage 15/ For 6 mos.	.05 bu	1.02	6.10
	.015 bu	18.00	18.00
		4.50	4.50
		0.00	0.00
		8.10	8.10
SUBTOTAL COST			\$103.60
Interest at 8percent for six months			4.14
SUBTOTAL PRODUCTION COSTS			\$107.74

SOURCE: Idaho Department of Water Resources

TABLE 5
 PRODUCTION COSTS
 IN OWYHEE COUNTY FOR ALFALFA

Operation	Times Over	Custom Cost per Acre	Total Cost per Acre
Establishment (4 years)	1	\$ 8.47	\$ 8.47
Fertilizing, Dry, Broadcast	1	2.60	2.60
Fertilizer 1/ 0205	80 lbs.	0.00	0.00
Spraying 14/ Chemicals 8/7/	2	0.25	20.00
2 4-D	2 pts.	2.71	5.42
Swathing	3	0.00	0.00
Baling (3 times)	5.57/ton	1.02	2.04
Hauling & Stacking (3 times)	3	5.10	15.30
	3.88/ton	30.64	30.64
		21.34	21.34
SUBTOTAL COSTS			\$105.81
Interest at 8 percent for 6 months			4.23
SUBTOTAL PRODUCTION COSTS			\$110.04

SOURCE: Idaho Department of Water Resources

- TABLE 6

PRODUCTION COSTS
IN OWYHEE COUNTY FOR BEANS

Operation	Times Over	Custom Cost per Acre	Total Cost per Acre
Plowing	1	\$ 8.38	\$ 8.38
Disking	1	3.21	3.21
Harrowing	2	1.67	3.34
Planting 13/	1	4.38	4.38
Seed 4/ 6/	120 lbs.	0.50	60.00
Fertilizing, Dry, Broadcast	2	2.60	5.20
Fertilizer 1/ N	40 lbs.	0.00	0.00
P295	100 lbs.	0.30	12.00
Spraying 14/ Chemicals 8/7/ 2,4-D	2	0.25	25.00
		2.71	5.42
		0.00	0.00
Cultivating 19/	2 pts.	1.02	2.04
	3	3.00	9.00
Cutting	.47 cwt.	8.46	8.46
Combine	1.50 cwt.	27.00	27.00
SUBTOTAL COSTS			\$173.43
Interest at 8 percent for 6 months			6.94
SUBTOTAL PRODUCTION COSTS			\$180.37

SOURCE: Idaho Department of Water Resources

TABLE 7

PRODUCTION COSTS
IN OWYHEE COUNTY FOR SUGAR BEETS

Operation	Times Over	Custom Cost per Acre	Total Cost per Acre
Plowing	1	\$ 8.38	\$ 8.38
Disking	1	3.21	3.21
Harrowing	2	1.67	3.34
Planting	1	6.00	6.00
Seed 5/ 6/	2 lbs.	2.00	4.00
Fertilizing, Dry, Broadcast	3	2.60	7.80
Fertilizer 1/ N	200 lbs.	0.00	0.00
P205	100 lbs.	0.30	60.00
K20	80 lbs.	0.25	25.00
Spraying	3	0.15	12.00
Chemicals 13/71		2.71	8.13
		0.00	0.00
Treflan	2 pts.	3.18	6.36
Ro-neet	1/2 gal.	27.00	13.50
Cultivating	4	3.75	15.00
Weeding (hoeing)	2	18.00	36.00
Thinning	1	15.00	15.00
Topping & Digging	2.57/ton	77.10	77.10
Hauling	1.45/ton	43.50	43.50
SUBTOTAL COSTS			\$344.32
Interest at 8 percent for 6 months			13.77
SUBTOTAL PRODUCTION COSTS			\$358.09

SOURCE: Idaho Department of Water Resources

TABLE 8
 PRODUCTION COSTS
 IN OWYHEE COUNTY FOR POTATOES

Operation	Times Over	Custom Cost per Acre	Total Cost per Acre
Plowing	1	\$ 8.38	\$ 8.38
Disking	1	3.21	3.21
Harrowing	2	1.67	3.34
Planting 18/1	1	10.84	10.84
Seed 3/ 6/	20 cwt.	5.30	106.00
Fertilizing, Dry, Broadcast	3	2.60	7.80
Fertilizer 1/ N	240 lbs.	0.00	0.00
P205	120 lbs.	0.30	72.00
K20	100 lbs.	0.25	30.00
Spraying 14/ Chemicals 7-10/ 2,4-D	4	0.15	15.00
Eptam	2 pts.	2.71	10.84
Treflan	1/2 gal.	0.00	0.00
Thiodan	2 pts.	1.02	2.04
Cultivating	4	16.90	8.45
Harvesting 16/ Piling 17/ Hauling 18/ Storage 15/	4 pts.	3.18	6.36
	.34 cwt.	1.56	6.24
	.03 cwt.	2.00	8.00
	.13 cwt.	128.52	128.52
	.16 cwt.	11.37	11.37
		49.14	49.14
		60.48	60.48
SUBTOTAL COSTS			\$548.01
Interest at 8 percent for 6 months			21.92
SUBTOTAL PRODUCTION COSTS			\$569.93

SOURCE: Idaho Department of Water Resources

TABLE 9

PRODUCTION COSTS AND REVENUE
FOR A 320-ACRE FARM
(310 Acres Actually Irrigated)

TABLE 9 (Cont.)

Revenues: (1976 Normalized Prices)

Potatoes - yield 315 cwt, price \$ 3.76, 63 acres =	\$74,617.20
Wheat - yield 75 bushels, 3.56, 55 acres =	14,685.00
Barley - yield 75 bushels, 2.57, 55 acres =	10,601.25
Alfalfa - yield 5.5 tons, 45.87, 19 acres =	4,793.42
Beans - yield 18.75 cwt, 18.55, 68 acres =	23,651.25
Sugar Beets - yields 20 tons, 31.84, 50 acres =	31,840.00
Total Revenue	= \$160,188.12

Costs:

Production

Plowing (291 acres)	\$ 2,438.58
Disking (291 acres)	1,110.66
Harrowing (291 acres)	971.94
Planting	1,632.76
Establishment (4 years alfalfa)	160.93
Seed	11,975.50
Fertilizing, Dry, Broadcast	1,856.40
Fertilizer	10,992.00
N	5,220.00
P205	1,545.00
K20	2,157.16
Spraying	
Chemicals	
24-D	
Treflan	1,201.40
Eptan	718.68
Thiodan	532.35
Ro-Neet	393.12
Cultivating	675.00
Harvesting	1,866.00
Swathing	9,083.46
Baling	290.70
Cutting	582.16
Weeding	575.28
Thinning	1,800.00
Topping and Digging	780.00
Piling	3,855.00
Hauling	716.31
	6,138.28

Costs

(Cont.)

Storage	\$ 4,770.30
Combining	2,826.00
Sprinkler System (40/ac)	12,400.00
Sprinkler Labor @ \$3.50/hr. for 749 hrs.	2,621.50
Production Cost Subtotal	\$ 103,797.81

Net Return to Land @ 9 percent

8,267.08

Interest Expense for 6 mos. @ 8 percent

3,674.26

Total Production Cost

\$ 103,797.81

Annual Pumping System Cost (92.43/Acre)

\$ 28,653.30

(Assumes 650 ft. lift and 6-8 miles transportation)

Annual Pumping Energy Cost

\$ 22,013.10

(3757 KWH/Acre and 18.9 mill/KWH)

Total Costs

= \$ 154,464.21

NET FARM PROFIT

Total Revenue

\$ 160,188.12

Less Total Costs

\$ 154,464.21

Profit Per Acre (310 Acres)

\$ 5,723.91

Profit Per Acre (310 Acres)

\$ 18.46

Rates charged for Custom Farm Operations in Idaho, Withers and Roetheli,
April 1975, University of Idaho.

APPENDIX 3-3

COMMUNITY DEVELOPMENT MODEL

A community development model was developed for the U.S. Department of Energy and published in a report titled: "Socioeconomic Impact Assessment: A Methodology Applied To Synthetic Fuels", which was published in April of 1978.

The factors used in the model are derived from socioeconomic profiles of mining dominant counties and the "Construction Worker Profile" of large-scale energy construction projects. The "cost of sprawl" was also used.

The model estimates impacts at the county level. It does not estimate impacts for multi-county regions or for municipalities or other sub-areas within counties. For this ES, the four county market area has been treated as a single county for incorporation with this model.

The model has some limitations. An important one is that it estimates gross, not net, impacts. Another limitation is that it describes conditions of selected points in time, not the evaluation of conditions leading up to or following from these points.

The major sources used in the model are: 1) ERDA, "Socioeconomic Profile," unpublished, 2) Old West Regional Commission, "Construction Worker Profile," 1975, 3) Council on Environmental Quality, "Costs of Sprawl," 1974.

Portions of the model can be "lifted" out and calculated without the requirement of the total model being run. Those portions of the model used and the corresponding calculations are shown below. All calculations are in 1975 dollars. The population data used is based on implementation of the proposed action via the provisions of the Carey Act.

POPULATION AGE DISTRIBUTION

Age Group	75	5-17	18-29	30-44	45-64	65+	Total
Percent	10.3	28.7	28.0	19.5	10.1	3.4	100.0
Number	102	283	276	192	100	33	986

School Enrollment:

Elementary and high school = population 5-17 years x .90 (283 x .90 = 255)

School Teachers:

Elementary and High School = school enrollment x .045 (255 x .045 = 11.475)

Living Situation:

Population in families = total population x .92 (986 x .92 = 907)

Population in other households = total population - population in families (986 - 907 = 80)

Households:

Families = population in families ÷ 3.8 persons per family = 907 ÷ 3.8 = 239

Other households = population in other households ÷ 1.25 persons per household = 80 ÷ 1.25 = 64

Total Households = families and other households (239 + 64 = 303)

Expected Social Service Personnel:

Physicians = 1.5 per 1,000 population (1.5 x .986 = 1,479)

Registered Nurses = 8.0 per 1,000 population (8.0 x .986 = 7,888)

Health Support Personnel = 2.5 per 1,000 population (2.5 x .986 = 2,465)

Police and Firemen = 3.5 per 1,000 population (3.5 x .986 = 3,451)

Total Housing Needs:

Total household x 1.05 (303 x 1.05 = 318)

Housing Needs by Type:

Type	Single-Family	Mobile Home	Multi-Family	Total Needs
Percent	.60	.25	.15	1.00
Number	191	80	47	318

Public Facility Land Requirements:

Land costs (police and fire) = facility development costs x .08 (\$70,992 x .08 = \$5,679)

Land costs (other public facilities) = facility development costs x .06 (\$292,842 x .06 = \$17,571)

Total land requirement = total land costs ÷ \$8,500 per acre (\$23,250 ÷ \$8,500 per acre = 2.74 acres)

Residential-Related Street System:

Arterials (100 ft. R.O.W.) = (single family units x 6 ft. per unit) + (mobile homes x 5.5 ft. per unit) + (multi-family units x 5 ft. per unit) = (191 x 6) + (80 x 5.5) + (47 x 5) = 1,821 ft.

Collectors (60 ft. R.O.W.) = (single family units x 7 ft. per unit) +
(mobile homes x 17.25 ft. per unit) +
(multi-family units x 13.5 ft. per unit)
= (191 x 7) + (80 x 17.25) + (47 x 13.5) =
3,352 ft.

Minor Streets (50 ft. R.O.W.) = (single family units x 47 ft. per unit) +
(mobile homes x 22 ft. per unit) +
(multi-family units x 10 ft. per unit)
= (191 x 47 ft) + (80 x 22) + (47 x 10) = 11,207 ft.

Community Street System:

Arterials = Arterials (residence - related) x 1.76 = 1,821 x 1.76 = 3,205

Collectors = Collectors (residence - related) x 1.1 = 3,352 x 1.1 = 3,687

Minor Streets = Minor Streets (residence - related) x 1.1 = 11,207 x 1.1 = 12,328

School Enrollment, by Grade Level:

Elementary = total school enrollment x .72 = 255 x .72 = 184

High School = total school enrollment x .28 = 255 x .28 = 71

School Bldg. Space:

Elementary = elementary enrollment x 120 sq. ft. per pupil = 184 x 120 ft.²
= 22,080 sq. ft.

High School = high school enrollment x 150 sq. ft. per pupil = 71 x 150 ft.²
= 10,650 sq. ft.

Total Bldg. Space = elementary + high school = 22,080 ft.² + 10,650 ft.²
= 32,730 ft.²

School Facility Development Costs:

Total school bldg. space x \$34 per square foot = 32,730 x \$34 = \$1,112,820

Other School Development Costs:

Facility development costs x .12 = \$1,112,820 x .12 = \$133,538

Schools, Total Capital Costs:

Total development costs = Facility development costs + other development costs
= \$1,112,820 + \$133,538 = \$1,246,358

Land Costs = total development costs x .04 = \$1,246,358 x .04 = \$49,854

Total Capital Costs = total development costs + land costs
= \$1,246,358 + \$49,854 = \$1,296,212

Community Street System Development Costs:

Arterials = arterial street length x \$117 per ft. = 3,205 x \$117 = \$374,985

Collectors = collector street length x \$58 per ft. = 3,687 x \$58 = \$213,846

Minor Streets = minor street length x \$37 per ft. = 12,328 x \$37 = \$456,136

Total development costs = arterials + collectors + minor streets
= \$374,985 + \$213,846 + \$456,136 = \$1,044,967

Community Street System, Total Capital Costs:

Land costs = total development costs x .07 = \$1,044,967 x .07 = \$73,148

Total capital costs = total development costs + land costs
= \$1,044,967 + \$73,148 = \$1,118,115

Public Facility Development Costs:

Police Facilities = total population x \$40 per person = 986 x \$40 = \$39,440

Fire Facilities = total population x \$32 per person = 986 x \$32 = \$31,552

Government Administration = total population x \$20 per person = 986 x \$20 = \$19,720

Health Care Facilities = total population x \$236 per person

= 986 x \$236 = \$232,696

Library Facilities = total population x \$41 per person

= 986 x \$41 = \$40,426

Total Development Costs = police + fire + government administration + health +
library = \$39,440 + \$31,552 + \$19,720 + \$232,696 + \$40,426 = \$363,834

Public Facilities, Total Capital Costs:

Total Development Costs + Land Costs = \$363,834 + \$23,250 = \$387,084

Total Capital Costs:

Grand Total = sum of Schools, total Capital Costs + Community Street System,
total Capital Costs + Public Facilities, total Capital Costs = \$1,296,212,
+ \$1,118,115 + \$387,084 = \$2,801,411.

APPENDIX 3-4

PROPERTY TAX CALCULATION

PROPOSED ACTION

County Land In ES Area

<u>County</u>	<u>Acres In ES Area</u>	<u>Percent</u>
Owyhee	46,800	42%
Elmore	51,115	46%
Twin Falls	13,100	12%
	<u>111,015</u>	<u>100%</u>

Average 1977 assessed land valuation in three county areas was \$131 per acre.

<u>County</u>	<u>Potential Assessed Valuation</u>	<u>Average Mill Levy</u>
Owyhee	\$ 6,130,800	\$ 8.17
Elmore	6,696,065	7.30
Twin Falls	1,716,100	11.75
	<u>\$14,542,965</u>	<u>\$ 9.07 (average)</u>

Property Tax Per County

<u>County</u>	<u>Property Tax</u>	<u>Percent</u>
Owyhee	\$ 750,404	41%
Elmore	917,269	51%
Twin Falls	146,051	8%
	<u>\$1,813,724</u>	<u>100%</u>

APPENDIX 3-5. ENERGY METHODOLOGY AND ANALYSIS

NUMBER OF ACRES IRRIGATED FROM RIVER, WELLS

The total measured 109,279 acres was divided into 98,489 river-irrigated acres and 10,790 well-irrigated acres, based on the assumption that 80 percent of the land in the central portion of the ES area (in the C.J. Strike-Swan Falls reach) will be irrigated from groundwater. The measured total of 109,279 differs slightly from the 111,015 acre theoretical total. The difference is small, about 1.5 percent, and the results from instrument error and differences in estimating acreages from map overlays.

COMPARISON WITH 1977 PER ACRE ELECTRICITY REQUIREMENT

A comparison of average year per acre electricity consumption of the proposed action with 1977 per acre consumption in the study area is slightly misleading, since 1977 was a drought year, with generally higher water use than would be typical.

CALCULATION OF DROUGHT YEAR DIVERSION, DISTRIBUTION

The calculation of the "worst case" diversion of 3.51 acre feet/acre was based on the theoretical consumptive irrigation requirements in the Grandview-Saylor Creek area for each of the five crops in the assumed long-term rotation (Sutter, Bob, and G.L. Corey, "Consumptive Irrigation Requirements for Crops in Idaho," Bulletin 516, July 1970, University of Idaho, College of Agriculture Experiment Station).

The total per acre water requirement, weighted for the assumed rotation (22 percent potatoes, 16 percent sugar beets, 35 percent grain, 21 percent beans and 6 percent alfalfa), was calculated from the Sutter-Corey "maximum" and "mean" water requirements for each crop. The ratio of the maximum to the mean water requirement for the rotation was then applied for each month to the original "average year" monthly water application, transforming it into the "worst case" water application displayed in Table 1.

CALCULATION OF DOWNSTREAM HYDRO LOSSES ON IPC SYSTEM

The average year hydrolosses at the eight IPC dams affected by the proposed action are shown in Table 3-18. For land irrigated out of the river, the per acre depletion was based on the "average year" monthly water requirement, shown in Table 3-17. Of the water diverted each month, fifteen (15) percent was assumed to return to the river over a ten-month period, starting with the month of diversion. For land irrigated out of wells, the net depletion to the river was assumed to be at the rate of 2 acre-feet per acre, spread out evenly over 12 months.

Using these assumptions, the total proposed action net diversion above each IPC dam could be calculated, based on the following table of acres to be irrigated relative to the dams:

	<u>River</u>	<u>Wells</u>
Above Upper Salmon	0	0
Above Lower Salmon	48,180	0
Between Lower Salmon and Bliss	0	0
Between Bliss and C.J. Strike	46,053	7,032
Between Strike and Swan Falls	1,026	4,104
Between Swan Falls and Brownlee	4,620	0
	<u>99,879</u>	<u>11,136</u>

According to the IDWR Snake River streamflow model, in an "average year" (average of 48 years of streamflow data), all the diversions would be usable for electrical generation at all the dams except Swan Falls, based on dam capabilities and average monthly streamflows. At Swan Falls, the diversions would be entirely usable only in June, July and August and partially usable in September.

The 15 percent return flow assumption (provided by IDWR) results in a calculated increase in streamflow outside the irrigation season. Therefore in non-irrigation months there is a slight increase in hydro generation. Over 12 months in the average year the net hydro loss would be 154,262 MWH, as compared to 160,731 MWH lost over the irrigation season.

The hydro losses for the "worst case" year, shown in Table 3-19, were calculated as described above, except the river depletions were determined on the basis of the "worst case" rather than the "average year" water requirement, shown in Table 3-17. Since the worst case assumes low streamflows, the diversions were assumed to be usable at all dams in all months.

Because of the 15 percent return flow assumption, as described above, there is a slight increase in electrical generation outside the irrigation season, giving a net annual electricity loss of 211,576 MWH, as compared to 214,506 MWH lost over the irrigation season.

CALCULATION OF IPC REVENUES, SYSTEM AVERAGE AND CLASS AVERAGE PRICE UNDER EACH SCENARIO

In each case of the self-sufficiency scenario (cases 1A, 1B, 2) the proposed action irrigators would pay for 374 million KWH of the new supply (see Table 3-18, line 1, Direct Consumption) at the calculated new price of electricity for irrigators (from Table 3-20). In each case, also, the 154 million KWH of hydro losses due to the proposed action would be made up by the new supply and would be assumed to be sold at the new system average price. In Case 1A, the remainder of the power, or 1422 million KWH is assumed to be sold at system average price. In Case 1B, the remainder, or 840 million KWH would be sold for export at 10 mils/KWH. In 1A and 1B line losses, estimated at 8.5 percent of all power generated (not counting electricity to make up hydro losses), result in no revenue.

In Case 3, of the 475 million KWH imported by IPC June-September, 310 million KWH would be paid for by proposed action irrigators, with 136 million KWH for hydro losses and the remainder for line losses.

The new system average price for each of the four price estimates was calculated by adding the annual cost of each new supply to the 1977 revenues of \$150 million and dividing this total required revenue by the sum of the new annual supply for each case and the 1977 supply of 9217 million KWH. Theoretical new average prices for each customer class were calculated on the basis of a set of ratios of class price to system average price in 1977. This calculation assumes no change in the allocation of costs to customer classes or the rate structure. (Such changes in the future are impossible to predict).

HYDRO LOSSES AT FCRPS DAMS

Hydro loss calculations were made based on the monthly water diversions of the proposed action and the cumulative value of 617.7 KWH/acre foot for the 8 affected dams. This calculation assumes that all water would be usable at all of the 8 dams. In addition it was assumed that there would have been a market for all the lost hydrogeneration. These two assumptions are based on the recent Army Corps of Engineer Studies which predict that by 1980 there will be sufficient peaking capacity added to all dams so that no water need be spilled and that there will be markets year round for all electricity generated.

CASE 1B--IPC EXPORT POWER WOULD REPLACE PNW HYDRO LOSSES

For the case of IPC addition of 260 MW of capacity with off season sale of electricity at surplus prices, the cost of PNW hydro losses has been offset by the assumed export sales of IPC power. That is, off season sales to the PNW from the new IPC capacity are considered as replacement for the lost PNW hydroelectricity. Because it is sold at a surplus price of 10 mils/KWH the non-IPC portion of the PNW benefits. Rather than replacing the lost hydroelectricity at 35 mils/KWH an amount of electricity sufficient to cover the losses is made available at 10 mils/KWH. The net annual benefit to the non IPC portion of the PNW is \$15.8 million.

TABLE A

MEASURED ACRES IN THE PROPOSED ACTION BY LIFT HEIGHT AND DISTANCE
(REDUCED BY 25% FOR PUBLIC LEAVE AREAS)

	- MILES -											
LIFT	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	14-16	TOTAL		
50	116	5	--	--	--	--	--	--	--	121		
150	1611	124	33	--	--	--	--	--	--	1768		
250	2486	701	205	177	82	21	--	--	--	3672		
350	1158	1045	446	146	282	92	6	--	--	3175		
450	4259	1814	1167	848	845	143	--	--	--	9076		
550	2730	4609	1373	1507	853	646	--	--	--	11718		
650	1413	6596	7431*	5561**	3919	5092	2091	24	24	32127		
750	15	580	3733	3384	2153	4316	2321	290	290	16792		
850	--	225	381	3241	2869	1213	443	--	--	8372		
950	--	--	161	2279	4839	999	271	--	--	8549		
1050	--	--	--	180	247	388	593	206	206	1614		
1150	--	--	386	52	200	296	35	--	--	969		
1250	--	--	--	46	355	50	--	--	--	451		
1350	--	--	--	--	71	18	--	--	--	89		
TOTAL	13788	15699	15316	17421	16715	13274	5760	520	520	98489		
										10790	WELLS	
										109279		

* Median lift height and distance for all land

** Median lift height and distance for river-irrigated land

Source: Prepared for the Bureau of Land Management
by Integrated Energy Systems, Inc., Boise, Idaho.
(Contract No. YA-512 - CT8 - 226)

TABLE B

KWH/ACRE

PROPOSED ACTION "AVERAGE CASE"

Lift Ft	Distance Miles							
	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16
50	939	1216						
150	1272	1547	1826					
250	1605	1877	2156	2436	2715	2994		
350	1938	2208	2487	2766	3045	3324	3603	
450	2271	2538	2817	3096	3376	3655		
550	2604	2869	3148	3427	3706	3985		
650	2937	2199	3478*	3757	4037	4316	4595	4874
750	3270	3530	3809	4088	4367	4646	4925	5204
850		3861	4139	4418	4697	4977	5256	
950			4470	4749	5028	5307	5586	
1050				5079	5358	5638	5917	6196
1150			5131	5410	5689	5968	6427	
1250				5740	6019	6299		
1350					6350	6629		

Wells: (100' lift, 0 distance) 1105 KWH/ACRE

* Median lift height and distance for all acres, including well-irrigated land

Source: Prepared for the Bureau of Land Management
by Integrated Energy Systems, Inc. Boise, Idaho.
(Contract No. YA-512 - CT8 - 226)

Table C

KWH/ACRE

PROPOSED ACTION "WORST CASE"

Lift (Ft)	Distance - Miles							
	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16
50	1277	1655						
150	1732	2104	2484					
250	2185	2554	2934	3314	3694	4075		
350	2638	3006	3383	3763	4143	4523	4903	
450	3092	3456	3836	4213	4593	4972	5352	
550	3545	3907	4286	4666	5042	5422	5802	
650	3996	4357	4736*	5116	5496	5876	6251	6631
750	4448	4803	5186	5566	5946	6326	6701	7081
850		5253	5632	6012	6392	6771	7151	
950			6082	6461	6841	7221	7601	
1050				6911	7291	7670	8050	7981
1150			6981	7360	7740	8112	8500	
1250				7810	8190	8569		
1350					8639	9019		

WELLS: (100' lift, 0 distance): 1504 KWH/acre

* Median lift height and distance for all acres, including well-irrigated land

Source: Prepared for the Bureau of Land Management
by Integrated Energy Systems, Inc. Boise, Idaho.
(Contract No. YA-512 - CT8 - 226)

APPENDIX 8-1 ENERGY METHODOLOGY AND ANALYSES

MAXIMUM DEVELOPMENT - CALCULATION OF ELECTRICITY USE

The number of acres measured in the maximum development alternative, reduced by 25% for public leave areas was: 135,280 acres assumed to be irrigated out of the river, and 37,484 acres assumed to be irrigated out of wells, for a total of 172,764 acres. The array of river-irrigated acres by lift height and distance is shown in Table A.

The difference between the measured 172,764 acres and the actual 176,310 acres represents a 2% error in map work and measurement.

The total direct electricity demand calculated from the lift/distance array as described in Chapter 3, was adjusted upwards by the ratio of 176,310/172,764 to arrive at the direct demand for the actual 176,310 acres in the maximum proposal. The total direct demand of 555,897 MWH/ year and 756,137 MWH/year in the average and worst case (drought) years, respectively, was then distributed according to the average and worst case monthly distributions shown in Table 3-17, Chapter 3.

The method of calculating hydro losses was described in Chapter 3, Appendix 3-5. For the maximum development, the number of acres irrigated with respect to IPC dams are as follows:

	<u>River</u>	<u>Wells</u>
Above Upper Salmon	0	0
Above Lower Salmon and Bliss	58,635	0
Bliss - C.J. Strike	68,649	21,816
C.J. Strike - Swan Falls	4,032	16,128
Swan Falls - Brownlee	<u>7,050</u>	<u>0</u>
	138,366	37,944

In the calculation of hydro losses for the maximum development, there are net losses in all months of the year, as opposed to the proposed action calculation, which showed net gains in non-irrigation months. The gains in the proposed action calculation were due to the return flow assumption, as explained in Chapter 2. In the maximum development alternative, the river depletions caused by pumping out of wells (2 acrefeet/acre, spread out evenly over 12 months) outweigh the return flows in all months, resulting in a net depletion, and therefore electricity loss, in all months. Total hydropower lost over 12 months would be 218,482 MWH in the average year, or 321,158 MWH in the worst case year.

MINIMUM DEVELOPMENT - CALCULATION OF ELECTRICITY USE

The number of acres that were measured, as described in Chapter 3, with lift heights less than 500 feet, was 17,812 acres. The difference between this and the 21,702 river irrigated acres in the minimum development alternative is accounted for by the fact that the minimum development contains land that would have to be considered to have a higher lift height if irrigated by the shortest route from the river. In the minimum alternative, it is assumed that it would be feasible to irrigate this land by a more circuitous route, keeping the lift height below 500 feet. The distance from the river along the longer route was measured for this additional land, and it was added to the lift height, distance array at 450 feet of lift. The new array is shown in Table B.

The direct demand of the minimum alternative was calculated as described in Chapter 3.

The hydro losses on the IPC system were calculated on the basis of the following distribution of acres irrigated with respect to the IPC dams:

	<u>River</u>	<u>Wells</u>
Above Upper Salmon	0	0
Above Lower Salmon - Bliss	1,350	0
Bliss - C.J. Strike	15,210	5,040
C.J. Strike - Swan Falls	462	1,848
Swan Falls - Brownlee	<u>4,680</u>	<u>0</u>
	21,702	6,888

As in the maximum development alternative, there are net losses in all months, because well depletions outweigh return flows. The hydro losses on the IPC system over 12 months would be 36,530 MWH in the average year and 48,420 MWH in the worst case year.

TABLE A

MEASURED ACRES IN THE MAXIMUM DEVELOPMENT ALTERNATIVE BY LIFT HEIGHT AND DISTANCE
(REDUCED BY 25% FOR PUBLIC LEAVE AREAS)

LIFT	- MILES -											TOTAL	
	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16					
50	136	5	14	--	--	--	--	--	--	--	--	--	155
150	1985	204	199	26	15	--	--	--	--	--	--	--	2429
250	2895	1770	583	455	164	24	--	--	--	--	--	--	5891
350	1517	2091	1568	607	661	209	20	--	--	--	--	--	6673
450	4930	2792	1897	1375	1441	291	10	--	--	--	--	--	12736
550	3520	5981	1930	2188	1792	959	4	--	--	--	--	--	16374
650	1780	8386	9392	6604	5188	6680	2609	24	--	--	--	--	40663
750	15	855	4433	4783	2657	5389	2738	433	--	--	--	--	21303
850	--	234	680	4420	3642	1343	558	--	--	--	--	--	10877
950	--	72	726	3002	5720	1517	333	8	--	--	--	--	11378
1050	--	53	389	476	598	760	727	258	--	--	--	--	3261
1150	--	--	506	59	470	1043	518	--	--	--	--	--	2596
1250	--	--	--	46	357	383	51	--	--	--	--	--	837
1350	--	--	--	--	71	36	--	--	--	--	--	--	107
TOTAL	16778	22443	22317	24041	22776	18634	7568	723					135280
												WELLS	37484 *
													172764

* Wells are evaluated at 100' and 0 miles from the water source.

Source: Prepared for the Bureau of Land Management
by Integrated Energy Systems, Inc. Boise, Idaho.
(Contract No. YA-512 - CT8 - 226)

TABLE B
 MEASURED ACRES IN THE MINIMUM DEVELOPMENT ALTERNATIVE BY LIFT HEIGHT AND DISTANCE
 (REDUCED BY 25% FOR PUBLIC LEAVE AREAS)

LIFT (FEET)	- MILES -							TOTAL
	0-2	2-4	4-6	6-8	8-10	10-12	12-14	
50	116	5	--	--	--	--	--	121
150	1611	124	33	--	--	--	--	1768
250	2486	701	205	177	82	21	--	3672
350	1158	1045	446	146	282	92	6	3175
450	4259	2488	1723	2364	1383	547	202	12966
TOTAL	9630	4363	2407	2687	1747	660	208	21702
								WELLS 6888 *
								28590

* Wells are evaluated at 100' and 0 miles from the water source.

Source: Prepared for the Bureau of Land Management
 by Integrated Energy Systems, Inc. Boise, Idaho.
 (Contract No. YA-512 - CT8 - 226)

APPENDIX 9-1
MAJOR PESTICIDES USED ON CROPS IN ES AREA

CROP	PESTICIDE ^{1/}	LD-50 ACUTE (ORAL) mg/kg. ^{2/}	TOXICITY RATING ^{3/}	CHEMICAL CLASSIFICATION	APPLICATION METHOD	COMMENTS
Potatoes	Temick (I)	0.9	1	Carbamate-systemic	Capsules drilled into ground or granules side dressed in planting furrow and covered with soil.	These systemic insecticides are initially extremely toxic; however, they have short half lives and do not persist in the environment. Since these pesticides are placed under the soil surface, they are out of reach of and pose little danger to wildlife species.
	Di-syston (I)	2.6-12.5	2			
	Thimet (I)	2-4	2	Organophosphate-systemic	Sprayed with field equipment or aircraft.	
	Eptam (H)	1630	4	Carbamate		
	Sencor (H)	1936-1986	4	Tricizine		
	Dinoseb (H)	40-60	3	Di-nitrophenol		
Sugar Beets	Ro-neet (H)	3160-4100	4	Carbamate	Drilled into soil in late fall.	Low Toxicity
	Betanal (H)	Greater than 8,000	5	Methylcarbamilate	Sprayed with field equipment.	
Winter Wheat, Barley	2,4-D (H)	370	3	Chlorophenoxy	Sprayed with field equipment or aircraft.	
	MCPA (H)	700-800	4			
	Bromoxymil (H)	190	3	Benzonitrite		
	Carbyne (H)	600	4	Chlorocarbamilate		
Dry Beans	Eptam (H)	1630	4	Carbamate	Sprayed with field equipment before crops are planted.	Low toxicity
	Treflan (H)	Greater than 10,000	5	Fluorotoluidine		
Alfalfa	Simazine (H)	Greater than 5,000	4	Triazine	Spray with field equipment in late fall.	Parathion may be the most hazardous in this group of pesticides because of its high toxicity (but short persistence) and the spray application. Aerial spraying in the spring could for instance, kill young pheasant chicks if directly sprayed by parathion.
	Malathion (I)	1375	4	Organophosphate	Sprayed with field equipment or aircraft.	
	Imidan (I)	300	3	Organophosphate		
	Parathion (I)	13	2	Organophosphate		

Source: Idaho Department of Health and Welfare (1979)

^{1/} The symbol (I) represents an insecticide; (H) represents an herbicide.

^{2/} The "acute oral LD₅₀ (in mg/kg)" means the dosage of toxicant (expressed in milligrams of toxicant per kilograms of body weight of the animal) it would take to kill 50 percent of the animals (in this case, mice) in the test population when given orally. Thus the lower figures are associated with the more toxic compounds.

^{3/} Based on the LD₅₀ value of the pesticide.

1 = extremely toxic, 2 = highly toxic, 3 = moderately toxic, 4 = slightly toxic, 5 = practically non-toxic.

GLOSSARY

GLOSSARY

Acre Foot: Volume of water that would cover an acre to a depth of one foot, equal to 43,560 cubic feet or approximately 326,000 gallons.

Aesthetics: Dealing with the nature of the beautiful and with judgements concerning beauty.

Air Quality Standard: An established concentration, exposure time, or frequency of occurrence of a contaminant or multiple contaminants in the ambient air which shall not be exceeded.

Algal Bloom: A proliferation of living algae on the surface of lakes, streams, or ponds. Algal blooms are stimulated by phosphate enrichment.

Allotment: An area of land where one or more individuals graze their livestock. It generally consists of public land but may include parcels of private or state owned lands. An allotment may consist of several pastures.

Allotment Management Plan (AMP): A documented program for a livestock operation on the public lands. It prescribes how the livestock operations will meet sustained yield, multiple-use, economic, and other needs and objectives for the public lands as determined through land-use planning; the type, location, ownership, and general specifications for range improvements that would be installed and maintained; and other provisions related to livestock grazing and other public land management objectives.

Alluvium: Clay, silt, sand, and gravel or other rock material transported by flowing water, and deposited as sorted or semi-sorted sediments.

Ambient Air: Any unconfined portion of the atmosphere; the outside air.

Animal Unit Month (AUM): The amount of forage one cow, five sheep, about fifteen pronghorn antelope, five deer, one horse, or one moose eat(s) in one month.

Aquifer: A geologic unit that contains water and that can deliver it to wells, springs, or seeps.

Archeological Resources: The physical evidence of past human occupation which can be used to reconstruct the culture of past peoples. The archeological record is usually expressed in the form of districts, sites, structures, and objects.

Artifact: Any object made, modified, or used by man.

Average Megawatts: Total megawatts consumed in a given month divided by the number of hours in that month.

Base Flow: The dry-weather flow of a stream, generally sustained by seepage of groundwater.

Benthic: Occurs at the bottom of a pond, lake, or stream.

Biochemical Oxygen Demand (BOD): The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter in an effluent.

British Thermal Unit (BTU): A measure of heat or energy equivalent to 252 calories.

Calcareous Soil: A soil containing calcium carbonate, or a soil alkaline in reaction because of the presence of calcium or magnesium carbonate.

Civilian Labor Force: Comprises the total of all civilians classified as employed or unemployed in accordance with the criteria described above.

Claypan: A compact, dispersed, slowly permeable soil horizon rich in clay and separated more or less abruptly from the overlying soil. Claypans are commonly hard when dry and plastic or stiff when wet.

Coliform: A group of bacteria used as an indicator of sanitary quality in water. The total coliform group is an indicator of sanitary significance because the organisms are normally present in large numbers in the intestinal tracts of humans and other warm-blooded animals.

Consumptive Use: As used here means the amount of water transpired in the process of plant growth plus the water evaporated from soil and foliage in the area occupied by the growing plant.

Crucial Wildlife Habitat: That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species either as individuals or as a population.

Cubic Feet per Second: A measure of water flow. The number of cubic feet of water (1 CFS=7.5 gallons) that pass a fixed point in a second.

Cultural Resources: Those fragile and nonrenewable remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features, that were of importance in human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred--even though evidence of the event no longer remains, and (3) the environment immediately surrounding the actual resource. Cultural resources, including both prehistoric and historic remains, represent a part of the continuum of events from the earliest evidences of man to the present day.

Demand (Electricity): The amount of electricity required by the customers of an electric utility over a given period of time.

Desalinization: Removal of salts from saline soil, usually by leaching.

Diversion: The taking of water, generally for a specific use, from a stream, reservoir, or other body of water. The diversion rate may be given in cubic feet per second, acre-feet per year, million gallons per day, etc.

Effluent: A discharge of pollutants into the environment, partially or completely treated or in its natural state. Generally used in regard to discharges into waters.

Employment: Comprises wage and salary workers (including domestics and other private household workers), self-employed persons, and unpaid family workers who worked 15 hours or more during the survey week in family-operated enterprises. Employment in both agricultural and nonagricultural industries is included. Also included are persons temporarily absent from work because of illness, bad weather, vacation, labor management dispute, or because they were taking time off for various reasons, even if they were not paid by their employers for the time off. Employed persons holding more than one job are counted only once. Commuters are shown at their place of residence and not at their place of work.

Endangered Species: Those species officially designated by the Fish and Wildlife Service through publication in the Federal Register as being in danger of extinction throughout a significant portion of their range. The Endangered Species Act of 1973 requires that critical habitat for endangered species be delineated and enjoins federal agencies from taking actions within such designated critical habitat that would have a significant adverse impact on the endangered species.

Hardpan: A hardened or cemented soil horizon or layer. The soil material may be sandy or clayey, and may be cemented by iron oxide, silica, calcium carbonate, or other substances.

Head (Electricity): Behind a dam, the difference in elevation between the top of the reservoir and the level at which the water comes out through the turbines.

Heritage Conservation and Recreation Service: A Department of the Interior agency created by combining the National Park Service, Interagency Archaeological Service, and Bureau of Outdoor Recreation. HCRS is responsible for making National Register eligibility determinations and for maintaining standards in projects funded by the National Historic Preservation Fund.

Historic Resources: All evidences of human activity that date from historic (i.e., recorded history) periods. Historic resources are cultural resources and may be considered archeological resources when archeological work is involved in their identification and interpretation.

Hydro (Hydroelectric): Refers to electricity generated by water power, e.g. dams.

Kilowatt Hour (KWH): The amount of electrical energy from 1 KW of generating capacity operating for 1 hour. The amount of electricity consumed by 1 KW of demand for 1 hour. Ten average (100 watt) light bulbs operating for 1 hour would consume 1 KWH of electricity.

Leaching: The removal of materials in solution by the passage of water through soil.

Load (Electricity): The amount of electricity that a utility must generate at any given time, or over a period of time, to satisfy the demand of its customers (see demand).

Mean Monthly Flow: The average of all monthly flows, for a particular month, for the period of record at a flow-measuring station. The mean monthly flow for a given month is the average of all daily flows for that month.

Median Water Year/Median Water Conditions: Refers to streamflows in a hypothetical year such that over a long period of time actual streamflows will be higher in half the years and lower in half the years.

Megawatt (MW): 1.000 Kilowatts.

Megawatt Hour (MWH): 1,000 Kilowatt hours.

Mil: One-tenth of a cent; 1,000 Mils = \$1.

National Register of Historic Places: The official list, established by the Historic Preservation Act of 1966, of the Nation's cultural resources worthy of preservation. The Register lists archeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, State, or national significance by State and/or Federal agencies and approved by the National Register staff. The Register is maintained by the Heritage Conservation and Recreation Service.

Nitrification: The formation of nitrates and nitrites from ammonia (or ammonia compounds), as in soils by micro-organisms.

Nonconsumptive Use: Water that is used, as for plant cooling, and returned to the source or to another body of water. Instream uses, such as for quality control or hydropower, are nonconsumptive.

Paleocene: A geological time unit referring to the earliest epoch (53 to 65 million years ago) of the Tertiary period which spans the time interval of from 2 million years ago to 65 million years ago.

Paleontology: The study of life in past geologic periods, based on fossil plants and animals, and the chronology of the earth's history.

Particulates: Any solid matter emitted by a contaminant source. It is composed of settleable matter (which will settle as dust within a

reasonable period of time) and suspended matter (which remains in the atmosphere until washed out by precipitation).

Peak Demand: The highest demand, measured over a relatively short period of time (an hour, a day or a month) that a utility experiences in the course of a year.

Perched Water: An isolated body of groundwater held above the zone of saturation (the place where openings in rock are filled with water) by a bed of low permeability through which the water does not pass readily.

Percolation: The downward movement of water through soil.

Point Source: Any stationary source causing emissions of any contaminant to the ambient air.

Prehistoric Resources: All evidences of human activity that pre-date recorded history and can be used to reconstruct lifeways and culture history of past peoples. These include sites, artifacts, environmental data, and all other relevant information and the contexts in which they occur.

Public Land: Historically, the public domain administered by the Bureau of Land Management for the purpose of providing forage, wood products, and minerals for public users. The uses and resources of these public lands have been expanded in recent years to provide open space, recreation resources, protection of cultural resources, and other commodities.

Raptor: Predator, specifically any of a group of birds of prey with a strong notched beak and sharp talons, as the eagle, hawk, owl, etc.

Reach: A portion of a given stream usually of a specified length.

Recharge: Water that, in entering an aquifer, replenishes the supply or raises the water level.

Riparian: As used here, riparian refers to the areas adjacent to streams and other bodies of water, wet meadows, springs, wells, and other sources.

Salvage: The recovery of material and data from an affected cultural resource, prior to its alteration or destruction, through recordation, documentation, partial or total excavation, and collection for analysis and interpretation.

Sensitive Animals: Animals classified by the BLM and Idaho Fish and Game Department are those:

- not yet officially listed but which are undergoing a status review or are proposed for listing according to Federal Register notices published by the Secretary of the Interior or the Secretary of Commerce, or according to comparable State documents published by State officials;

- whose populations are consistently small and widely dispersed,

or whose ranges are restricted to a few localities, such that any appreciable reduction in numbers, habitat availability, or habitat condition might lead toward extinction; and
-- whose numbers are declining so rapidly that official listing may become necessary as a conservation measure. Declines may be the cause of one or more of several factors including: destruction, modification, or curtailment of the species' habitat or range; overutilization for commercial, sporting, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; and/or other natural or manmade factors adversely affecting the species' continued existence.

Sheet Erosion: The removal of a fairly uniform layer of soil from the land surface by runoff water or wind.

Soil Horizon: A layer of soil, approximately parallel to the soil surface, with distinct characteristics produced by soil forming processes.

State Historic Preservation Officer (SHPO): The official within each State, authorized by the State at the request of the Secretary of the Interior, to act as a liaison for purposes of implementing the National Historic Preservation Act of 1966.

Threatened Species: Those species which are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. Critical habitat can also be designated for threatened species (see endangered species).

Visual Resource Management Class: The degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogeneous area.

Visual Resource: The land, water, vegetation, animals, and other features that are visible on all public lands.

Withdrawal: The removal of public (Federal) lands or resources from the operation of one or more forms of appropriation for private use or development.

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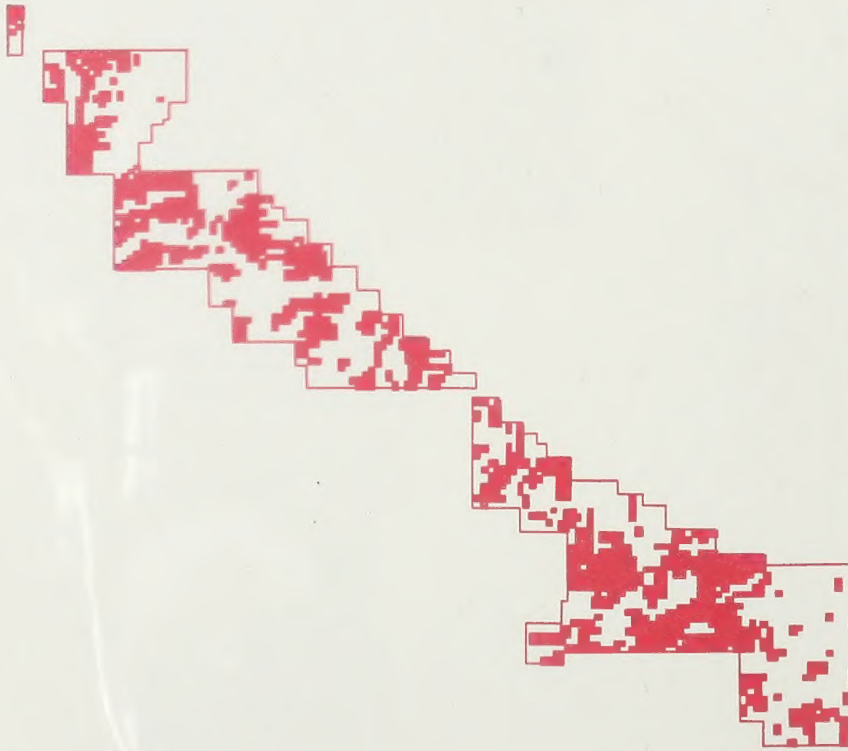
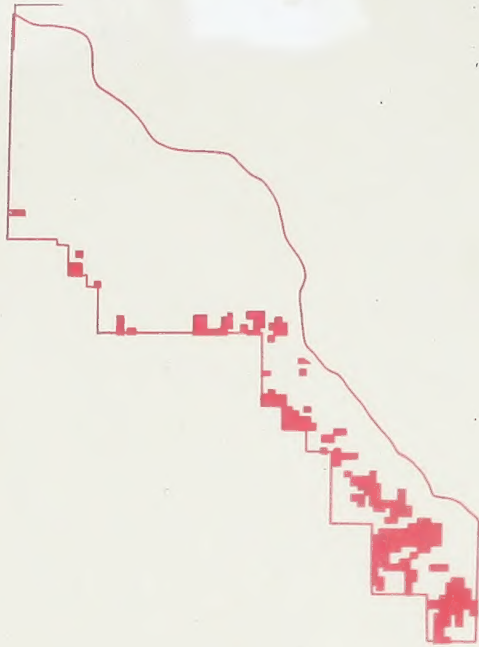
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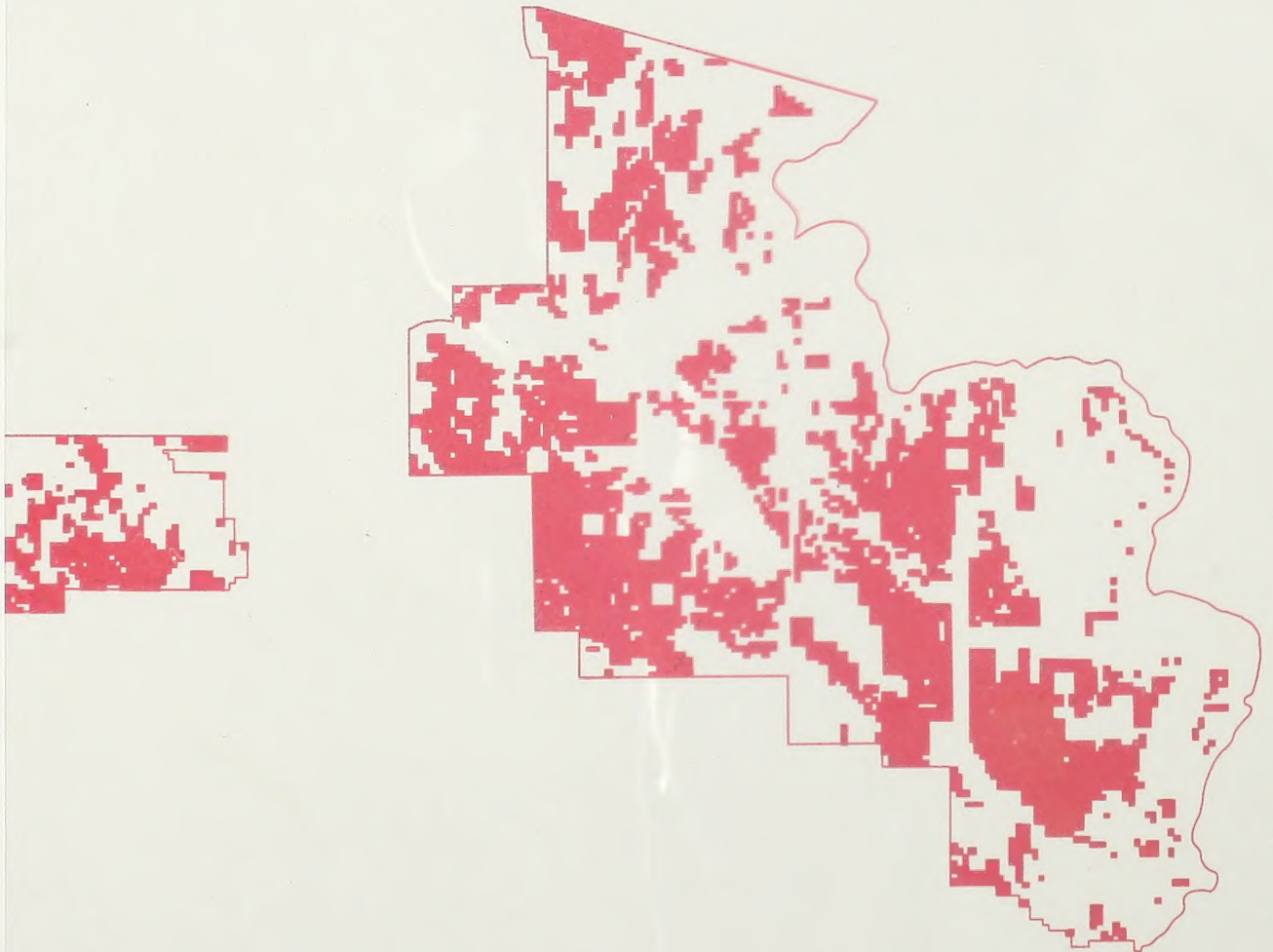
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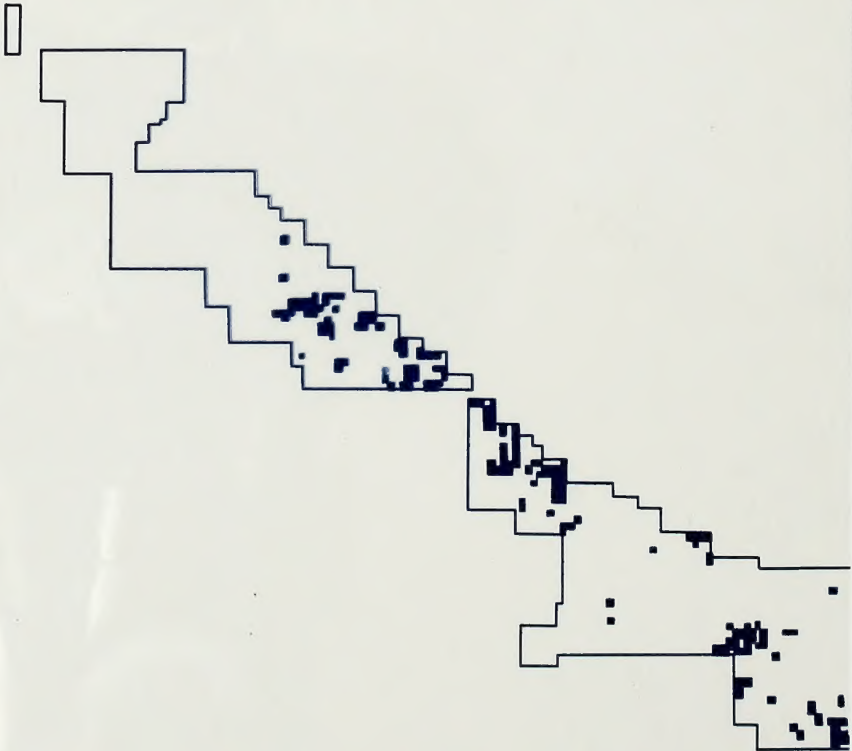
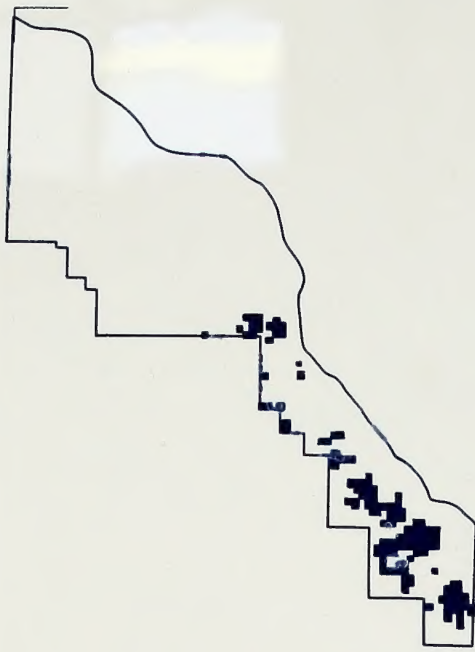
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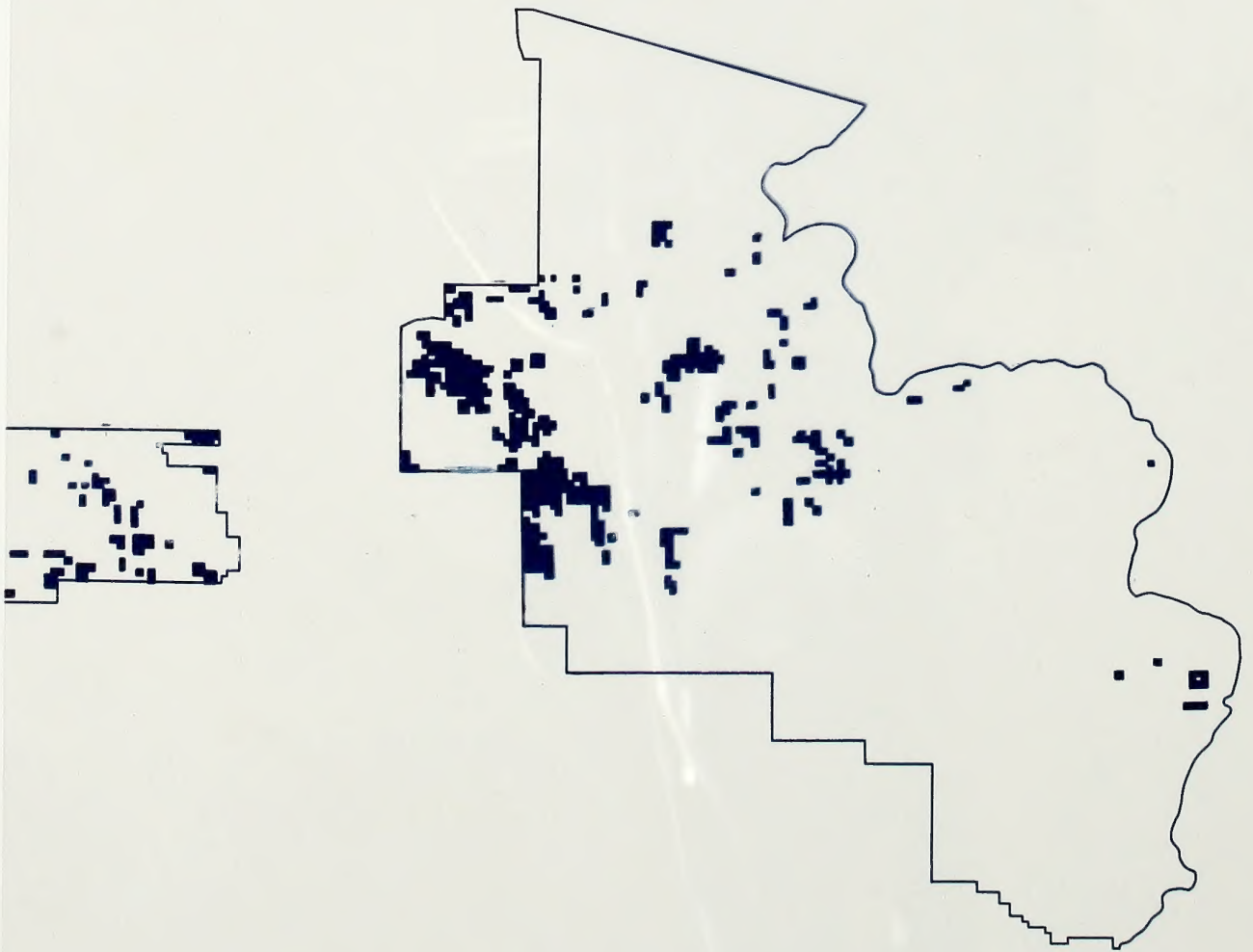
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